This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

KENSINGTON HALL

SYLLABUS OF LECTURES

BY R. JOHNSON.

Digitized by Google

Education

600070071L

Digitized by Google

Digitized by Google

Digitized by Google

SYLLABUS OF A SERIES OF

LECTURES,

EXERCISES, & CONVERSATIONS,

ON THE

PHYSICAL AND MENTAL SCIENCES,

AND THEIR MOST IMPORTANT DOMESTIC APPLICATIONS.

BEING A PART OF

THE GENERAL COURSE OF EDUCATION AND INSTRUCTION PURSUED AT

KENSINGTON HALL.

BY ROBERT JOHNSON,

DIRECTOR OF EDUCATION.

BIBLIOTHECA BODLEIANA

FOURTH EDITION.

LONDON:
HARRISON, 59, PALL MALL.
1855.

Digitized by Google

260. e. 21.

"Every sane person ought to know the obvious works of God, and modes of His manifestation; and every person may become acquainted with these in youth with ease and pleasure."—SIMPSON'S *Philosophy of Education.*

Digitized by Google

PREFACE.

In the Summer of 1850 I delivered my Inaugural Lecture, on the Re-opening of Kensington Hall, as a Collegiate Institution for Ladies. On that occasion, I explained my views on the subject of Female Education, particularly with reference to certain fundamental departments which I was anxious to impress upon the attention of my hearers, not because I wished to exaggerate their importance, but because I believed them to be very generally overlooked, or very imperfectly conducted. Among other things, I contended for an efficient system of mental development, grounded upon the well-regulated use of the higher faculties, as opposed to the dull tedious process of mere word teaching; I emphatically declared my opinion, that every scheme of Female Education should include the Rudiments of the Physical and Mental Sciences, as well for the intellectual culture they afford, as for the interesting and useful information they convey; and, lastly, I argued, that no plan should be deemed complete which excludes from its curriculum the application of knowledge to the duties of real life. What professions are to Men, domestic employments are to Women; and, although it is obviously impossible for Schools and Colleges to anticipate every variety of household economy, there is still a wide field of usefulness before them. Sound principles and their leading applications may be readily taught; and, when these are thoroughly acquired, a little home experience, under the guidance of a judicious Mother, will soon enable a well-trained mind to grapple with the domestic details of almost any position.

Digitized by Google

To these remarks it may be added, that the system here recommended does not contemplate any extraordinary or painfully laborious exertion, neither does it inculcate the abandonment of any one of the Accomplishments that refine and adorn the Female Character. All that is required is the surrender of a portion of the time that is commonly squandered in some of the vexatious and perfectly useless forms of Routine Teaching—in dry unintelligible tasks, dull spiritless lessons, tedious alike to teachers and to pupils, and detrimental to the health, the intellect, and the temper. Let a portion of this worse than wasted time be given up, and everything here referred to can be easily done—for many years it has been done—pleasantly and profitably to the pupils concerned, and without the appropriation of a single hour that properly belongs to other duties.

With these objects in view, the Pupils of this Institution are conducted through the Elements of the Physical and Mental Sciences, according to the plan described in former Editions of this Syllabus, but now more completely set forth in the following pages.

The various subjects are arranged in four progressive Divisions, each of which consists of two or more Courses of Lectures, Exercises, and Conversations, carefully adapted to the wants and capabilities of the attending Pupils.

The First or Preparatory Division is for Beginners who can read and write with tolerable ease, but no other qualification is necessary. It consists of two Courses, the properties of Common Things and the Senses, the former of which is conducted after the plan of Mayo's Lessons on Objects. A stone, a flower, a drop of water, and other things equally familiar, are made the subjects of instructive and entertaining Lessons, in which the Pupils are induced to gain knowledge by the exertion of their own faculties, to observe and collect facts for themselves, and to relate and record them in their own simple language. The advantages of this Division are very numerous: it exercises and strengthens the Perceptive Powers, it stimulates and gratifies Rational Curiosity, and it lays the foundation of Clear Thinking and Accurate Expression.

Digitized by Google

The Second or Junior Division receives Pupils who have gone through the First Division in a satisfactory manner, as well as those who join the Institution at an age that renders the preceding Courses unnecessary or inexpedient. It is called Elementary Science, and is intended to prevent technical impediments, and to prepare the way for more formal and systematic teaching by exhibiting the first Rudiments of Scientific Classification,—not, however, descending to Minutiæ, but confining the attention to broad distinctions easily recognized and remembered. The Observing Powers are as much engaged in this as in the last Division. The Reasoning Faculties and the Power of Expression are gradually more and more exercised.

The Third or Senior Division is the next step. Ladies who enter the Institution with their Education somewhat advanced are placed here; but if the subjects to be taught are entirely new to them, they will save time by beginning with a Course of Elementary Science, and a few Lessons in Geometry and Arithmetic. This Division embraces systematic Courses of Natural History and Natural Philosophy, which are conducted so as to exercise and invigorate the highest and noblest of the Intellectual Faculties, and to convey an accurate knowledge of great fundamental truths for future application and expansion. The Courses of Astronomy and Physical Geography are attended by those who possess the preliminary information which these subjects require.

The Elementary or School Department closes with this Division.

The Fourth or Advanced Division is intended for Pupils who have finished their Elementary Education, and are anxious to enter upon the higher branches of a College Course. Under the General Title of Practical Philosophy, and in three Sections—Man as a Physical Being, Man as a Mental Being, and Man as a Responsible Being—much useful information is imparted on matters of the first importance, but too often excluded from the Academical Education of Ladies. Particular attention is devoted to the Preservation of Health, Domestic Economy, the Constitution of the Human Mind, the Training of Children, and other subjects

Digitized by Google

of which the Lecturer's early Education for the Medical Profession, and his subsequent Experience as a Teacher, enable him to speak with practical effect.

To facilitate Classification, and to enable Special Pupils to see the whole system, the four Divisions are always in operation; and as several Courses are given concurrently, the series is completed in two years, in which period the First and Second Divisions are gone through twice, and the Third and Fourth once—that is, by the Lecturer. With respect to the time that a Pupil requires, so much depends upon herself—her Age, Attainments, Industry, and Ability—that it is almost impossible to give any decided information. When she enters at any early age, she is placed in the Preparatory Division, and, with ordinary talents and common attention, finds no difficulty in making her way through the series, within the usual period of Academical Education. If she joins us somewhat later, as a Junior or a Senior Pupil, she is placed in the Division to which she is entitled, and passes through the remainder of the series, or as much of it as time and circumstances permit. Referring to what has been done in former years, but omitting the First Division, as unavoidably less definite than the rest, the Second has been generally accomplished in a year, the Third in two years, and the Fourth in a year and a half. Superior minds have taken rather less, but this is a fair average; and, in Education, it must be remembered, there is a speed beyond which it is not safe to go. In every case, it is our study to promote the advancement of our Pupils with as much rapidity as is consistent with real progress and the acquisition of permanently useful knowledge. Whether they enter for the Series, or a part of it, we will do our best with the opportunities afforded us; but our pupils must bear in mind, that their position depends upon their own merits, and not upon the routine of a formal programme.

Advanced Pupils who enter the Institution for a Special Object, and not for General Education, may make their own selection from the Courses that are going on.

Appended to the Regular Courses, is a Miscellaneous List of Lectures, illustrating some of the preceding Subjects, and occasionally delivered at the Conversazioni.

Digitized by Google

The Physical Department is amply illustrated by an Extensive Collection of Specimens, Models, Apparatus, and Diagrams; and the Pupils are invited and encouraged to make themselves practically familiar with everything that is brought before them.

Directions to Pupils.

To Junior Pupils. Do not attempt to take Notes, for in the endeavour to reduce what you have heard to writing, you will lose ten times more than you can gain. When Notes are necessary, they will be given as Dictation Lessons. The Exercises you are desired to prepare, written or otherwise, must be your own. Of course, you will make many mistakes; but it is very important that I should see you precisely as you are. If you do not understand what you have heard or read, apply to me, and I shall be most happy to assist you. When we are conversing after the more formal part of the Lesson, ask me as many questions as you please concerning the matter in hand; and if I ask you any in return, let your answers be as simple and straight-forward as possible—exactly what you really think, and not what you have heard, or what you imagine I wish you to say. Examine the various Specimens and Diagrams, &c., as much as you please, but do not injure them; many of them are very delicate, and require the greatest care.

To Senior and Advanced Pupils. Observe the Rules before given, so far, at least, as they are applicable. You may take Notes of the leading Explanations and Illustrations; but let them be as short and concise as possible, hints to assist the memory, and not laboured transcripts of the Lecture. After the Lecture, as soon as you can, prepare and arrange the Materials for your written Exercise. Set before you your Syllabus, your Notes, and your Text Book; see how you can manage with the first and second, referring to the third when you are at a loss. When you have thus got possession of what you want, begin to write your Exercise in proper form. Never depart from this order, and begin to write before you have gained the requisite information. To assist you in drawing up your Reports and in preparing for

Digitized by Google

your Voluntary Examinations, the Syllabus of the Upper Courses is more than usually complete, that you may see the points which I deem most essential. Should the ordinary Text Books not give you the information you seek, you are at liberty to consult my private Library. The following Collections and Encyclopædias will be generally sufficient; but in cases of disappointment, I shall be happy to recommend other works:—CHAMBERS'S EDUCATIONAL COURSE—some of the Volumes are used as Class Books. CHAMBERS'S INFORMATION FOR THE PEOPLE; THE LIBRARY OF USEFUL KNOWLEDGE; ORR'S CIRCLE OF SCIENCES; THE ENCYCLOPÆDIA BRITANNICA; THE PENNY CYCLOPÆDIA.

Kensington Hall,
North End, Fulham.
February 1, 1855.

Digitized by Google

CONTENTS.

Preface iii
Directions to Pupils vii

Division I. LESSONS ON OBJECTS

Course I. The properties of Common Things 1
„ II. The Senses 2

Division II. ELEMENTARY SCIENCE

Course I. An Introduction to Natural History 4
„ II. An Introduction to Natural Philosophy 6

Division III. THE NATURAL SCIENCES

I. NATURAL HISTORY

Course I. The Mineral Kingdom 9
„ II. The Vegetable Kingdom 11
„ III. The Animal Kingdom 14

II. NATURAL PHILOSOPHY

Course I. Mechanical Philosophy, including Mechanics, Hydrostatics, Hydraulics, Pneumatics, and Acoustics 16
„ II. Heat and Light 19
„ III. Magnetism and Electricity 22
„ IV. Chemistry 25

III. ASTRONOMY 30
IV. PHYSICAL GEOGRAPHY 32

Division IV. PRACTICAL PHILOSOPHY

I. MAN AS A PHYSICAL BEING

Course I. The Principal Organs and their Functions 36
„ II. The Great Necessaries of Life, and their Relation to Health and Domestic Economy: Air, Warmth, Light, Food, Cleanliness, Exercise, and Rest 38
„ III. Accidents and Emergencies; or What to do in cases of difficulty and danger 52

II. MAN AS A MENTAL BEING

Course I. The Intellect and its Operations: The Perceptive Faculties. The Reflecting Faculties. The Ideal Faculty. Language. Combinations and Modes of Action 54
Truth. Taste 55

Digitized by Google

Course II. The Feelings and their Manifestations:
The Propensities. The Sentiments.
Combinations and Modes of Action 59
Natural Theology 61
III. Man as a Responsible Being
The Practical Duties of Life:
Duties to God; to Ourselves; to the Lower Animals; to our fellow Creatures 63
The Theory and Practice of Education, particularly with reference to the position and circumstances of Females 74
Appendix. Additional Illustrations of some of the preceding Subjects.... 81

Digitized by Google

DIVISION I.

LESSONS ON OBJECTS.

COURSE I.

THE PROPERTIES OF COMMON THINGS.

PART I.

1. Glass.
2. Indian Rubber.
3. Leather.
4. Sugar.
5. Sponge.
6. Water.
7. Wax.
8. Camphor.
9. Bread.
10. Sealing Wax.
11. Whalebone.
12. Blotting Paper.
13. Milk.
14. Salt.
15. Mustard.
16. Ivory.
17. Iron.
18. Chalk.
19. Vinegar.
20. Ginger.
21. Oil.
22. Pepper.
23. Coal.
24. Quicksilver.

PART II.

1. A Pin.
2. A Cube of Wood.
3. An uncut Lead Pencil.
4. A Pen.
5. A Candle.
6. A Chair.
7. A Book.
8. An Egg.
9. A Thimble.
10. A Penknife.
11. A Key.
12. A Cup.
13. A Pair of Scissors.
14. A Needle.
15. A Watch Glass.
16. A Piece of Honey-Comb.

Digitized by Google

Part III.

1. The principal parts of a Plant.
2. The principal parts of an Animal.
3. Tea.
4. Coffee.
5. Corn Plants.
6. Spices.
7. Wool.
8. Silk.
9. Cotton.
10. Flax.
11. Hemp.
12. Paper.
13. Ink.
14. A Penny.
15. A Shilling.
16. A Sovereign.
17. A Bank Note.
18. A Looking Glass.

Course II.

THE SENSES.

I. Touch or Feeling.

The Parts of the Body in which Touch is most acute. Animals remarkable for their sense of touch. The Knowledge which touch enables us to gain:—Form, Size, Roughness and Smoothness, Hardness and Softness, Temperature.

Exercises on the Information acquired by touch.

II. Taste.

The organ of Taste in man and some of the lower animals. The principal Flavours found in common objects: the Sweet, the Sour, the Alkaline, the Saline, the Bitter, the Astringent, the Metallic, the Aromatic, the Spirituous and the Nauseous. Some objects are Insipid, and others Acrid.

Exercises on the discrimination of bodies by their flavours.

III. Smell.

The organ of Smell in man and some of the lower animals. The principal Odours are the Ambrosial, the Fragrant, the Aromatic, the Almond, the Onion, the Burnt, the Narcotic, the Vinous, the Fetid, the Nauseous. Some bodies are Pungent, and others Inodorous. Agreeable Essences or Perfumes may be extracted from certain Plants.

Exercises on the Discrimination of Bodies by their odours.

Digitized by Google

Taste and Smell are very useful senses. They enable us to eat and drink with pleasure to ourselves; they assist us in distinguishing one object from another; and they not unfrequently warn us of dangers that we cannot see. Caution: pleasant tastes and sweet odours must not entice us beyond the limits of temperance. Neither ought they to be considered as giving infallible evidence of wholesomeness and security.

IV. Hearing.

The organ of Hearing in man and other animals. The cause of Sound. Different kinds of sound:—Noises; Musical Sounds; Treble and Bass sounds. Melody and Harmony. A peep at the interior of a Pianoforte.

Exercises on Sound.

V. Sight.

The organ of Sight in man and other animals. Sight informs us of many properties which the blind learn through the sense of touch,—as the Form, the Size, the Distance, the Number, the Surface, and the Solidity or Fluidity of objects. There are other properties which nothing but sight can reveal; and hence the following words can never be understood by a blind man:—transparent, translucent, opaque, bright, dull, luminous, sparkling, glimmering, twinkling, coloured.

Exercises on the Properties revealed by sight, particularly *Form* and *Colour*.

Digitized by Google

DIVISION II.

ELEMENTARY SCIENCE;

A FAMILIAR INTRODUCTION TO NATURAL HISTORY AND NATURAL PHILOSOPHY.

Course I.

NATURAL HISTORY.

Natural History treats of Animals, Vegetables, and Minerals. Animals and Vegetables are Organized beings, and possess many properties in common. Minerals are Unorganized beings. Organized beings live for a certain period, during which their organs are engaged in performing many important duties, as Nutrition, Growth, &c. Life is terminated by Death. Minerals have not life, nor do they exhibit any of the phenomena of life; they apparently decay and wear away,—that is, they change in form or composition—but they do not die. Some minerals are the remains of animals and vegetables once alive.

An Animal differs from a Vegetable in possessing Sensation and Voluntary Motion. Some instances of vegetable sensation and voluntary motion have been adduced; but they are very imperfect and unsatisfactory.

Minute classification will not be attempted in this course. The attention of the pupils will be chiefly confined to a few well marked specimens, the peculiarities of which determine the leading divisions and subdivisions to be afterwards more fully explained.

1. Minerals: Coal; Sand; Iron.
   Granite; Chalk; Lava.
2. Vegetables: A Geranium and a Fern.
   Beans; Grasses; Mosses; Mushrooms.
   The Oak; the Sugar Cane; the Tree Fern.
3. Animals: Man; the Eagle; the Lizard; the Herring; the Oyster; the Spider; the Starfish.

Digitized by Google

Questions and Exercises.

1. What is Natural History?

2. In what respects as to structure do Organized beings differ from those which are Unorganized?

To answer this question, consider the structure of a Root or an Eye, or examine, with the assistance of the microscope, a Leaf or a Hair, and compare what you have seen with specimens of Copper and Rock Crystal.

3. Put a crystal of Alum into a strong solution of the same substance. After some hours look at it. Has it grown? What is Growth? Miners say that metals grow; are they right? Can you explain the examples they give?

4. What beings are liable to Death? Is the word applicable to the decomposition of rocks; as, for instance, to the Cornish Granite, from which China Clay is obtained?

5. What are Fossils? Examine the minerals before you, and point out those which contain Fossils. What mineral substance in common use was once alive?

6. Mention the Properties which belong to Plants and Animals, and which distinguish them from Minerals.

7. In what do Animals differ from Plants?

8. Mention the Senses and their Organs. Upon what does the Vitality of the senses depend, and with what Organ do they communicate?

9. What are the Organs of Motion? What gives them vitality, and with what organ do they communicate?

10. A tray of the Minerals examined is before you; arrange them in their proper order, and explain the leading peculiarities of each Class.

11. Examine a Plant in full blossom; point out its principal parts, and endeavour to find the same in a Moss, a Fern, or a Fungus. To what result does this observation point?

12. Examine with the microscope leaves of the Fern, the Iris, and the Geranium. Then examine other plants in the same way, and arrange them in groups according to the appearances you observe.

13. Sow the packet of mixed seeds given you; note the different appearances as the plants rise above the earth, and arrange them in groups accordingly.

14. Examine sections of the Oak, the Sugar Cane, and the Tree Fern; describe the peculiarities of each. What do they illustrate?

15. Explain the diagrams illustrative of *Patterson's First Steps to Zoology*, as far, at least, as the more prominent divisions.

Digitized by Google

16. Test your knowledge by inspecting the portfolio of engravings, and arranging the various animals according to the classification depicted in the above diagrams.

Course II.

NATURAL PHILOSOPHY.

I. While Natural History describes and classifies the Objects of Nature as Organized and Unorganized Beings, Animals, Vegetables, and Minerals, Natural Philosophy regards them all as mere Matter, and from that point of view and with the aid of Observation and Experiment, notes the phenomena which they exhibit, and explains the Laws by which they are governed. Clear ideas, in connexion with the following words, will greatly assist the learner: *Matter, Phenomena, Law, Observation, Experiment, Analysis, Synthesis, Atom.*

II. The following are the principal properties of **Matter**:

1. Extension; Magnitude, Form.
2. Impenetrability.
3. Indestructibility.
4. Divisibility.
5. Inertia; Rest, Motion.
6. Attraction.
7. Repulsion.
8. Weight.
9. Porosity.
10. Solidity.
11. Fluidity.
12. Compressibility.
13. Dilatability.
14. Flexibility.
15. Elasticity.
16. Hardness.
17. Brittleness.
18. Malleability.
19. Ductility.
20. Tenacity.
21. Colour.
22. Temperature.
23. Taste.
24. Odour.

Some of these properties are *primary* and *essential;* others are *secondary* and *contingent;* and of these there are two sub-classes, the *general* and the *particular.*

Questions and Exercises.

1. Explain and illustrate the meaning of the words defined in the first part of the course.

2. Define Natural History and Natural Philosophy, and mention their principal branches.

Digitized by Google

3. State the substance of what was said concerning Magnitude and Form, and give examples of your own.

4. What property is illustrated by the Diving Bell? Why? Give other examples of the same property.

5. A log of wood soon burns away, leaving a few grains of ashes behind. Some lead kept for a time melted in a ladle, is converted into a powder heavier than itself. Are not these examples of the Destruction and Creation of matter? Why?

6. What property do Odoriferous Bodies illustrate? Give other examples of the same property.

7. Is Rest or Motion more natural to matter? Give other examples of the property to which this question refers.

8. What is Weight? Can it be shown that the invisible air has weight? How? Do you conclude that all things must necessarily have weight? Why?

9. A substance is said to have the Specific Gravity of 2; another of 5; and a third of 20. What does this mean, and to what scientific use is such knowledge applied?

10. Three or four Metallic Ores are before you. Which is the richest, and why? Explain the Base Coin Detector.

11. What is Porosity? Examples. Make a paper Filter, and show by experiment to what extent water is purified by filtration.

12. What are Solids and Fluids? The different kinds of fluid, with examples.

13. What do you understand by Compressibility and Dilatability? Mention the most common dilating power.

14. Define and illustrate Flexibility, Elasticity, Hardness, and Brittleness.

15. To what peculiarities do the words Malleability, Ductility, and Tenacity refer? Give a few examples.

16. If you possess Five Colours you may make all the rest. Name them. Three of these are simple. What are the other two, and how are they produced? Various colours are before you. Name them, and if compound, say of what simple colours they are composed. Observe the colours of the Rainbow and the Prism.

17. What is Temperature? On what principle does the Thermometer depend? Put one hand into very hot water and the other into very cold water, and then suddenly remove them into a mixture of the two. What are your sensations? Linen, Wool, and Marble that have been for some time in the same room appear by the thermometer to have the same temperature. Try them by the sense of touch, and explain the apparent contradiction. Is Clothing really warm? Upon what does the warmth depend?

Digitized by Google

Two lumps of ice were placed in the sun, one being inclosed in an iron box, and the other in a thick blanket; which was melted first? Why? Inspect the thermometer twice a day for a week, and record your observations.

18. Upon what does Taste depend? Several substances are placed in glasses before you; taste them; mention the various Flavours, and write down the Names of the Substances themselves, or, at any rate, the Classes, to which they belong.

19. Upon what does Odour depend? Name the principal odours, and mention a few of the objects which they characterize. Here are some bottles in which you may recognize the odours you have named. What do the bottles contain?

20. What is the difference between a property that is Primary and Essential and one that is Secondary and Contingent? What is the difference between a General Property and a Particular Property? Arrange the above-mentioned properties under these divisions, and be prepared to defend your classification.

Digitized by Google

DIVISION III.

THE NATURAL SCIENCES.

I. NATURAL HISTORY.

Course I.

THE MINERAL KINGDOM.

Minerals are Unorganized Bodies, but some of them, forming Masses, or Rocks, are composed, either wholly or partly, of the remains or beings once alive, brought into their present state by the operation of mechanical, chemical, and electrical powers.

Some minerals may be known by the *geometrical forms* in which they constantly appear; others, on the contrary, possess no such distinguishing mark, but occur in *irregular masses*. Minerals also differ in *weight*, *hardness*, *fracture*, *malleability*, *ductility*, *tenacity*, *lustre*, *colour*, *combustibility*, *solubility*, and other properties.

I. Combustibles:—
1. Sulphur.
2. Carbon; the Diamond, Plumbago, Amber, and Coal. Description of a Coal Mine, and of the art of making Gas for illumination.

II. Earths:—
1. Silica; Quartz, Flint, Sand, and other minerals in which silica is the principal ingredient.
   The manufacture of Glass.
2. Alumina; Clay, Slate.
   The manufacture of Pottery and China.
3. Lime; Limestone, Marble, Chalk, Gypsum, Alabaster.
   Building Stones and Cements.
4. Magnesia. Barytes. Strontian.

Digitized by Google

III. Metals.

These are found either *native* or as *ores*, generally in *veins* running through certain rocks.

There are forty-nine Metals; of these attention will be more particularly directed to the following:—

Platinum, Gold, Silver, Mercury, Iron, Copper, Tin, Lead, Zinc, and Arsenic.

Description of a Cornish Mine.

SYSTEMATIC GEOLOGY

Is a history of the world as a mineral structure. It treats of the *rocks* which compose its crust, their composition, their arrangement, and their origin; together with the changes they have undergone and are still undergoing from the operation of the great powers of nature.

Rocks are divided into—1. The Igneous, including the Plutonic and the Volcanic. 2. The Aqueous, including the Metamorphic and the Sedimentary. Igneous rocks are crystalline, unstratified, and destitute of organic remains. Aqueous rocks are stratified and rarely crystalline; the Sedimentary portion of them abounds in the remains of animal and vegetable life.

Questions and Exercises.

1. The specimens and diagrams illustrating the various subjects will be exhibited for a week after they are first brought forward. Inspect them carefully every day, that you may be prepared for the examination that precedes every lecture.

2. At the end of any great division, as Earths, Metals, &c., the specimens that were employed in the lectures will be placed upon the table without order and without labels, and the pupils will be required to name and arrange them. To render the exercise more complete, a few fresh specimens, not previously exhibited, will be mingled with the rest.

3. Draw a Diagram of the different Formations, and be prepared to explain and illustrate it either orally or in writing.

4. Arrange a tray of specimens according to your own diagram, and then compare what you have done with the engravings contained in the works of reference at your command.

5. Explain the geological diagrams that illustrate the Elementary text books on this subject.

6. A brief account of the Geology of London and its vicinity, with a drawing.

Digitized by Google

7. Visits to the British Museum, the Museum of Economic Geology, or the Museum of the Geological Society.

8. An account of the above visits, noticing the principal objects of interest, and paying particular attention to the extraordinary animal and vegetable remains contained in these collections.

9. To what uses may Geology be applied?

10. A geological exercise on the Map of England. Be prepared to mention the predominant Minerals of the various districts, and do not forget to notice the Geological Causes that determine the localities of the most important Industrial Employments.

Course II.

THE VEGETABLE KINGDOM.

I. Chemistry shows that the vegetable world is composed of fifteen elements, all of which are not found in every vegetable substance. Four of these elements are more abundant than the rest, and hence they are sometimes said to be more important. They are all doubtless equally important and essential, though some of them may be comparatively rare, and, in our judgment, less active and influential than the rest.

The microscope reveals the Structure of Plants, which is either Cellular, Vascular, or Fibrous.

II. The parts of plants and their functions:

1. Roots. Different kinds of roots, and parts generally called roots. The Functions of roots.
2. Stems. Bark; Wood; Pith. The stems of Exogenous and Endogenous Plants compared. Climbing plants. Underground stems.
3. Leaves. The Structure of the leaves of different kinds of plants. Simple and Compound leaves. The Functions of leaves.
4. Flowers. Calyx; Corolla; Stamina; Pistil.
5. Fruits and Seeds. The different Kinds of fruits, particularly those which are most useful to man. Seeds, their means of preservation and defence. Germination; the Plumula and the Radicle; the Seed Leaves or Cotyledons. The classification arising from an observation of the cotyledons.
6. The Fructification of Flowerless Plants.

Digitized by Google

7. Appendages. Spines; Prickles; Stings, &c.
8. Secretions and Proximate Principles:—Albumen; Fibrine; Caseine. Lignine; Gum; Starch; Sugar; Resin; Opium; Caoutchouc; Oil; Wax. Acids; Alkalis. Colouring Matter.
9. The Respiration, Nourishment, Growth, Colour, and Odour of plants, including the effects of Heat, Light, Electricity, Moisture, and Soil.

SYSTEMATIC BOTANY.

1. The system of Linnæus, often called the ARTIFICIAL SYSTEM, groups the various plants into twenty-four classes; the first twenty-three of which depend upon the number, position, and other peculiarities of the stamina, while the last includes Ferns, Mosses, and all Flowerless Plants. The classes are subdivided into Orders, the orders into Genera, and the genera into Species.

2. The NATURAL SYSTEM arranges plants in two great divisions, according to their Anatomical Structure.

Division I. Vasculares or Cotyledoneæ, including all Flowering or Phanerogamous Plants, the first twenty-three classes of Linnæus.

Division II. Cellulares or Acotyledoneæ, including all Flowerless or Cryptogamous plants, the twenty-fourth class of Linnæus.

Division I contains two classes:

Class I. Dicotyledoneæ or Exogenæ, embracing four sub-classes.

Sub-class 1. Thalamifloræ.
2. Calycifloræ.
3. Corollifloræ.
4. Monochlamydeæ.

Class II. Monocotyledoneæ or Endogenæ.

Division II consists of one class, Acotyledoneæ or Acrogenæ, of which there are two sub-classes.

Sub-class 1. Foliaceæ.
2. Aphyllæ.

QUESTIONS AND EXERCISES.

1. Soon after every lecture write from your notes a short account of the Parts and Functions described, and endeavour to find illustrations in the garden or the greenhouse. In cases of difficulty, and as a test of accuracy, consult a botanical work, *after*

Digitized by Google

you have done your best. At the beginning of every lecture you will be required to exhibit what you have done during the preceding week.

2. Prepare specimens of the three fundamental structures for microscopical examination. The plants named in the lectures will not be received.

3. Sow the seeds given you, and when the plants appear above the ground arrange them in classes.

4. A walk in the Flower Garden.

5. A walk in the Kitchen Garden. This and the last exercise will be frequently repeated.

6. Describe the mode of preparing a Hortus Siccus, and exhibit two or three Specimens.

7. What effects are produced upon plants by Temperature, Moisture, Soil, Light, and Electricity?

8. A conversation on Gardening, with particular reference to the agents last mentioned. Practical illustrations.

9. The Operations of Gardening, including the cultivation of plants in pots. There cannot be a more delightful recreation than the study of flowers. Even the arrangement of a bouquet and the floral decoration of a room are not destitute of useful results.

10. Make a List of the Linnæan Classes; explain them; and give two or three characteristic Examples of each.

11. Prepare a similar account of the Natural System.

12. In an elementary course like this you cannot be expected to be very familiar with the *Natural Orders;* but you may probably be asked to explain and illustrate a few of the more interesting and important, particularly such as include the common plants in our fields and gardens.

13. Give an account, in the form of letter or essay, of a recent visit to Kew Gardens, describe the objects that interested you most, and make any remarks that occur to you.

14. With the knowledge obtained by these means, inspect the botanical phenomena displayed in Carpets, Berlin Work, Paper Hangings, and the like, and see how far they agree with what you have been taught to observe.

15. During the winter, when a sufficient number of living illustrations cannot be procured, recourse will be had to Dried Specimens, to accurate Engravings, to Nature-Printing, and to the beautiful representations of the Phantasmagoria, by which means some of the exercises will be done till the arrival of a more favourable season.

16. With the assistance of a Map of the World, relate what you know concerning the geographical distribution of plants.

Digitized by Google

Course III.

THE ANIMAL KINGDOM.

1. Vegetables and animals have many properties in common; but to the former are denied sensation and voluntary motion. The structure of the animal frame is exquisitely adapted to these important characteristics, and affords innumerable instances of Divine Wisdom and Beneficence. As the modern system of classification depends entirely upon Structure, a brief account of the principal *organs* and their *functions* will be given as an introduction to that interesting subject.

SYSTEMATIC ZOOLOGY.

Division I. Vertebrata. Animals with backbones.
Division II. Invertebrata. Animals without backbones.

I. Vertebrate animals are distributed into four classes.

1. Mammalia.
2. Birds.
3. Reptiles.
4. Fishes.

II. Invertebrate animals are arranged in three subdivisions, Mollusca, Articulata, and Radiata.

Of the Mollusca there are six classes.

1. Cephalopoda.
2. Gasteropoda.
3. Pteropoda.

} Group I. Encephala.

1. Lamellibranchiata.
2. Brachiopoda.
3. Tunicata.

} Group II. Acephala.

Of the Articulata there are five classes:

1. Arachnida.
2. Insecta.
3. Crustacea.
4. Cirripeda.
5. Annellata.

Of the Radiata there are four classes:

1. Radiaria.
2. Zoophyta.
3. Entozoa.
4. Infusoria.

Digitized by Google

In treating the Invertebrata, the attention of the pupils will be chiefly directed to two or three characteristic members of each class; the Vertebrata will be more minutely examined. To sustain the interest as much as possible, it has been found advisable to invert the usual order, and to begin with the Infusoria, gradually ascending to the Mammalia, the highest class o animated beings.

Questions and Exercises.

1. Write a short essay on the Leading Characteristics which are common to all Organised beings, and which distinguish them from Mineral subtances. Treat in like manner the characteristics which distinguish Animals from Vegetables. Endeavour to give examples of your own, and not those which were given at the lecture.

2. After every lecture write down the name of the Class or Order investigated; explain its distinguishing peculiarities; mention the examples which illustrated the lecture, and give two or three others derived from your own reading, or from your recollection of what you have seen in public institutions. At the beginning of every lecture you will be called upon to report progress.

3. Seek for Illustrations in the house, the garden, &c. The common animals that may be seen every day are quite as interesting as those which are comparatively rare. Use the Microscope in observing minute animals, as the Infusoria, or parts of larger animals, as the Eyes of the Spider, and the Wings of Insects.

4. Examine Thames Water, the Water supplied by Public Companies, and the Water in Dirty uncovered Cisterns.

5. A short account of the Senses in Man and the Lower Animals.

6. Visits to the British Museum and the Zoological Gardens.

7. Diagrams illustrating the classification adopted in the lectures are before you; explain them, and give additional illustrations of your own.

8. Take the portfolio of Engravings, arrange them in their proper Classes, and be prepared with reasons for what you do.

9. Mention the principal Varieties of the Human Race, their characteristic Peculiarities of body and mind, and the Localities in which they are found.

10. With a Map of the world before you, relate what you know concerning the Geographical Distribution of Animals.

Digitized by Google

II. NATURAL PHILOSOPHY.

Course I.

MECHANICAL PHILOSOPHY.

Mechanics.

Matter is naturally inert, indifferent to rest or motion. The application of Force is the cause of both rest and motion. Motion may be absolute, relative, or common—uniform, accelerated, or retarded—in a right line, or in a curve. A body in motion has a distinct principle of Force called its Momentum or Force of Motion. The phenomena of Weight, of Falling Bodies, and of the Pendulum, are caused by the attraction of Gravitation. All solid bodies have a Centre of Gravity.

The three fundamental Laws of Motion.—1. Every body will continue in a state of rest, or of uniform motion in a straight line, unless it be acted upon by some external force.—2. Change of Motion is always proportional to the moving force impressed, and is made in the direction of that force.—3. Every action is accompanied by an equal and contrary reaction.

The Simple Machines or Mechanical Powers are the Lever, the Wheel and Axle, the Pulley, the Inclined Plane, the Wedge, and the Screw. Machines do not create power; they merely convey power communicated to them from some source of motion, as Muscular Energy, Springs, the falling of Weights and of Water, the action of Air and Steam. No human art can produce perpetual motion; for the best machine has unavoidable imperfections, and motion has obstacles that man cannot remove.

The Properties of Fluids.

1. Hydrostatics—the science of Liquids in a state of rest. Liquids have so little Cohesion that they may be easily penetrated; and being possessed of Gravity, they cannot be removed without the support of a solid substance; they immediately receive the form of the vessel into which they are put; and they always maintain, when in a connected open mass, a uniform level surface. A liquid presses equally in all directions, the amount of pressure

Digitized by Google

being regulated, not by its quantity, but by its vertical height, and the extent of its base. A solid immersed in water displaces its own bulk of water, and the force with which the solid is buoyed up is equal to the weight of the water displaced. When a solid of greater density than water is totally immersed in water, it loses exactly as much of its weight as the weight of an equal bulk of water. Hence by comparing the weight of a body with the force which holds it up in water, we ascertain its Specific Gravity.

2. HYDRAULICS—the science of Liquids in Motion. The properties of Liquids considered with reference to Water Mills, the Hydraulic Press, the flow of Water in Pipes and Channels, the action of Springs and Fountains, and the formation of Waves. Motion may be communicated to water not only by the ordinary mechanical means, but by the agency of Heat; and hence may be explained the formation of Ice upon the surface of Rivers and Lakes, and the contrivance for warming rooms by the ascent of Hot Water.

3. PNEUMATICS—the science of Air Phenomena. Air possesses the general properties of Matter, as Impenetrability, Weight, &c. It is a fluid, but its particles being widely separated, it is much lighter than Liquids and more elastic. Being a fluid, it exhibits all the characters of fluidity:—it presses equally in all directions according to its depth without regard to its mass; it preserves a uniform level surface, and like the liquid ocean, it gives support to substances immersed in it. The principal pneumatic phenomena depend upon the properties of Weight and Elasticity. When these are understood, the following objects will be introduced—the Cupping Glass, the pneumatic apparatus attached to certain Insects, the Syphon, the Argand Lamp, the Barometer, the Pump, the Forcing Pump, the Fire Engine, Balloons, and Fountains.

4. ACOUSTICS—the science of Sound. Three things are necessary to produce the sensation of Sound,—a vibrating body, a suitable Medium, and an Ear in full nervous life. Sound radiates; it may be concentrated and reflected. Musical Sounds arise from equal vibrations, and the more numerous the vibrations in a given time, the sharper the note. Every note arises from a certain fixed number of vibrations, a knowledge of which explains the origin of Concords and Discords. To secure the proper number of Vibrations, attention must be paid to the Length, Weight, and Tension of the Vibrating Body. Musical Sounds differ in quality or character from various modifying causes, as the materials of the

Digitized by Google

instrument, the mode of playing it, the presence of a sounding board, the size and structure of the room, the nature of its furniture, &c.

The Vocal Organ is a Musical instrument endowed with peculiarities to which no other instrument can pretend. A knowledge of the sounds of our language and of the manner in which they are produced suggests the means of correcting the errors of bad speakers, and of removing some of the common forms of vocal impediment.

Questions and Exercises.

1. Define and illustrate the terms employed in the Lectures on Mechanics, taking for your examples the things and events of every day life, whenever these are applicable.

2. Make drawings of the Mechanical Powers, and explain their Action.

3. What may be said of the boast of Archimedes?

4. A conversational recapitulation of the first division of the Course, including an account of Clocks and Watches, their sources of Motion, and the means of regulating them.

5. The leading properties of Liquids.

6. A brief account of the Air; its Extent—Weight, Elasticity, and Pressure—the Consequences of these properties.—The Barometer, its Construction and Uses, with drawings.

7. A Series of Observations on the Weather, recorded in a tabular form, with Columns for the Date, Barometer, Thermometer, Direction of the Wind, State of the Atmosphere at the time of Observation, Weather, Remarks. Two observations to be made every day, at the same hours, for any period not less than two weeks.

8. A conversational Recapitulation of the Laws of Fluidity, with Experiments performed by the Pupils.

9. The Laws of Fluidity applied to the House;—Pumps, Water Supply, Drainage.

10. A Practical Explanation of the structure and action of the Pianoforte and the Harp.

11. Taking the Harp as most convenient, compare the length of its Strings with the results obtained by calculation and confirmed by Experiment on the Monochord. Explain this.

12. Draw up a Table of the Vibrations of an Octave, and the length of the Strings necessary to produce its various notes.

Digitized by Google

13. Illustrate on the Organ the Theory of Concords and Discords.

14. Explain the Diagrams of the Ear and the Vocal Organs.

15. Construct a Table of the principal Sounds in our language, and show how Children should be taught to pronounce them, particularly in cases of difficulty. Apply this knowledge to your own Reading and Singing, and endeavour to profit by the test.

Course II.

THE PHILOSOPHY OF HEAT AND LIGHT.

Heat.

Of the Nature of Heat we have no certain knowledge. Some conjecture that Heat is a peculiar fluid; while others contend that heat is not matter, but that it arises from a vibration among the particles of matter. Cold is merely a less degree of Heat.

The Sources of Heat are the Sun, Percussion, Compression, Friction, Condensation, Electricity, Chemical Action, and Animal Life.

The effects of Heat.—1. Expansion. Heat increases the volume of Solids and Fluids: Cold has an opposite effect. The most useful application of this law is the Thermometer.—2. Fluidity. A Solid is first expanded by Heat, and then converted into a Liquid; if the temperature be sufficient, it becomes still rarer, and assumes the form of gas or vapour. Bodies undergo these changes at very different temperatures. When a solid becomes fluid it combines with a quantity of Heat which cannot be detected by the Thermometer: hence it is called Latent Heat. When a Fluid becomes Solid, its Latent Heat is evolved. The melting of Ice, the freezing of Water, Evaporation, and freezing Mixtures, are illustrations of this law.—3. Ignition or the luminous appearance of highly heated objects.—4. Combustion—a concomitant of energetic chemical action,—attributed in the infancy of Chemical Science, to the liberation of a principle called Phlogiston. The discovery of the composition of Atmospheric Air overthrew this doctrine, and persuaded men to believe that Combustion is an effect of the union of a Combustible and a Supporter of Combustion;—in many respects true, but not

Digitized by Google

entitled to the appellation of a general law. A Supporter burns as much as a Combustible. Flame is a luminous film. The interior of a flame is vapour,—not in combustion, because it is not in contact with Air. Different bodies require different quantities of Heat to bring them to the same temperature.

Communication of Heat.—1. By Conduction. Copper, Silver, &c., allow heat to pass through them far more readily than Cork and Fur; hence the division of bodies into Conductors and Non-Conductors of Heat.—2. By Convection. Fluids are heated by a carrying process peculiar to themselves.—3. By radiation. Heat radiates from a heated body till its temperature is reduced to that of the objects surrounding it. The amount of Heat radiated in a given time depends, in a great degree, upon the nature of the surface of the radiating body. Radiated Heat may be reflected and absorbed. Dew and Hoar Frosts are among the effects of Radiation.

Practical Illustrations and Applications.—The Fusing and Refining of Metals, Infusion, Decoction, Distillation, the Preparation of Gas, the Warming of Rooms, the Steam Engine, the Miner's Safety Lamp.

Light.

The Nature of Light is still an object of dispute.

The Sources of Light are the Sun, the Stars, Combustion, Electricity, and various phosphorescent bodies.

Light radiates with immense velocity, becoming less intense as it spreads, and leaving shadows where it cannot fall. Light passes through certain objects; but when it enters a denser or rarer medium obliquely, it is refracted or bent in proportion to the degree of obliquity. A Lens is a refracting instrument—the degree and mode of refraction depending on the shape of the Lens. The Prism, another refracting instrument, enables us to analyse a ray of Light, and introduces us to the true theory of Colour. Light is reflected from polished surfaces which it cannot enter, so as to give a representation of objects placed before them. The character of the representation, whether enlarged, diminished, &c., depends upon the shape of the reflector. A knowledge of the laws of refraction and reflection enables us to understand a variety of interesting phenomena, and to produce and explain many useful and entertaining effects.

Digitized by Google

Optical Instruments and Apparatus.—The Camera Obscura, the Camera Lucida, the Eye, Spectacles, the Stroboscope, the Multiplying Glass, the Microscope, the Telescope, the Phantasmagoria, the Stereoscope, the Polariscope.

Light exerts powerful effects upon Animal and Vegetable Life, and likewise upon the Chemical Constitution of bodies. It gives, alters, and removes Colour. Photography.

Many of the Colours employed in painting suffer changes from Light and other causes. This part of the subject, together with the composition of the principal Paints, will be explained at the Conversazioni of the Essay and Conversation Class.

Questions and Exercises.

1. What do you understand by "Heat" and "Cold?"
2. Describe the Thermometer, and explain the principle upon which it depends.
3. Explain and illustrate the theory of Latent Heat, introducing as many practical Examples as possible.
4. What is Combustion, and what are the principal theories that have been advanced to account for it?
5. Explain the theory of the Davy Lamp. Is it a perfect Safety Lamp? Why?
6. Relate the principal facts connected with the Communication of Heat.
7. The Grass is covered with Dew, but the Gravel Walks are quite dry: Explain this.
8. A small quantity of Water that had been accidentally left in a shallow cup was frozen in the course of a night, while in a deep pond, equally exposed, there was not the smallest particle of ice. Can you tell me the cause of this?
9. Some sheep buried in the snow were found alive, while their companions that remained on the surface were frozen to death. Explain this.
10. Explain the Construction and Management of a Steam Cooking apparatus, in a manner sufficiently clear to be understood by an ordinary servant. Be sure to point out the causes of failure and accident.
11. Show that fluids and solids may be cooled without ice, taking Butter, Water, Wine, and Air as your illustrations.
12. Explain and illustrate the Laws relating to the Refraction and Reflection of Light, with special attention to subjects of a practically useful tendency, as Mirrors, Lenses, Spectacles, the

Digitized by Google

Microscope, and the Telescope. Expound the theory of Colour; and show that you know how to use the optical instruments you have mentioned.

13. Give a brief description of the human eye, with a drawing of its principal parts.

14. A shade being ordered for the eyes, cut out a pattern. Should coloured glasses be recommended, what is the best, or, rather, the only good tint?

15. A room is lighted by fifteen Candles; how many Gas burners of the kind before you would produce the same effect? Exhibit the process by which you arrived at your conclusion.

16. Exhibit and explain the Stereoscope, the Stroboscope, the Diagonal Machine, and any other Optical apparatus that may amuse a party of young friends; conclude with the Phantasmagoria.

Course III.

MAGNETISM AND ELECTRICITY.

Magnetism.

Certain Ores of Iron have the power of attracting Metallic Iron, and of communicating to it the same power. The attractive influence of a *Magnet* is not equally diffused over its surface, but seems to reside in two points, or *poles*, near its extremities. If a Magnet be freely suspended, one end invariably points towards the North and the other towards the South; hence the terms North and South Poles. Two North or two South Poles repel each other: North and South Poles attract each other. Magnetism may be communicated by *Induction*. The most important application of the Laws of Magnetism is the *Mariners' Compass*. A Magnet does not point exactly to the North, nor is its direction always the same; this is what is meant by Magnetical *Declination*, or Variation. A freely suspended Magnet remains horizontal at the Magnetic Equator; but it *inclines* or dips as it is removed Northward or Southward towards the Magnetic Poles.

Frictional Electricity.

The Friction of Glass against Silk, or of Sealing Wax against Cloth confers on these bodies the capability of attracting light substances. The Glass and Sealing Wax are said to be excited.

Digitized by Google

Many other objects may be similarly excited, while others exhibit no such effect; hence the division of substances into Electrics and Non Electrics. Non Electrics, as Metals and Water, are Conductors of Electricity; Electrics, as Glass and Sealing Wax, are Non Conductors.

Excited Glass or Sealing Wax after attracting objects repels them: but a substance repelled by Glass is attracted by Sealing Wax, and one that is repelled by Sealing Wax is attracted by Glass. To account for these phenomena, Dufay supposes that there are two distinct kinds of Electricity very different from each other;—one of which he calls Vitreous and the other Resinous Electricity. The characteristic of these two is that they repel themselves and attract each other. Franklin, on the contrary, maintains the existence of one Electricity, and refers the various effects to an excess or defect of Electricity:—hence the terms plus and minus, positive and negative.

The two conditions of electricity are always produced at the same time. An Electrified body causes substances in its vicinity to assume the opposite state of Electricity. This is called Induction.

Electrical Apparatus.—Electrometers, the Electrical Machine, the Leyden Jar, &c.

The Effects of Electricity.—1. Mechanical, as Attraction and Repulsion, and the destructive effects of Thunder.—2. Luminous, in passing through space from one conductor to another.—3. Calorific, melting Metals, and exploding Gunpowder.—4. Chemical, sometimes effecting combination and sometimes decomposition.—5. Physiological, as the shock.—6. Magnetical, causing needles, and even masses of iron, to exhibit magnetical phenomena.

Almost every change in the character of a body is accompanied by Electrical phenomena: hence the Electrical effects that attend Pressure, Heat, Evaporation, Chemical Action, and many of the functions of Animal and Vegetable Life.

Electricity exhibited by Nature.—Thunder and Lightning, Sheet Lightning, the Aurora Borealis, the Fire of St. Elmo, Waterspouts, Hail, &c.

Voltaic Electricity.

An Electrical Effect observed by Galvani, and first investigated on correct principles by Volta, is the origin of this Science. The

Digitized by Google

primary agent in the evolution of Voltaic Electricity is Chemical Action. It is distinguished from Frictional Electricity by its quantity, its low intensity, and its continued motion and reproduction.

THE APPARATUS of Volta, Babington, Cruickshanks, Wollaston, Daniell, Mullins, Groves, and Smee.

EXPLANATION OF TERMS AND THEORIES, particularly those which are employed by Faraday and other modern philosophers.

THE EFFECTS OF VOLTAIC ELECTRICITY are similar to those of Frictional Electricity, constantly modified by the characteristics before mentioned. The following experiments will be introduced as practical applications of the effects of Voltaic Electricity:—The Explosion of Gunpowder at a distance, or under water; the Decomposition of Water, and some of the Acids, Alkalis, and Salts; the Gilding and Silvering of Metals, and other illustrations of the valuable art of Electro-Metallurgy.

ELECTRO-MAGNETISM, AND OTHER FORMS OF ELECTRIC AND MAGNETIC DEVELOPMENT.

The phenomena of Magnetism may be produced by Electricity; hence the Science of ELECTRO-MAGNETISM and its marvellous Applications, particularly the *Electric Telegraph*.

The Phenomena of Electricity may be produced by Magnetism; hence the Science of MAGNETO-ELECTRICITY. Electricity produces heat, and Heat Electricity; the investigation of this belongs to THERMO-ELECTRICITY.

ORGANIC ELECTRICITY investigates the Electrical phenomena of Organized beings.

QUESTIONS AND EXERCISES.

1. Explain and illustrate the fundamental truths of Magnetism. Reduce what you have said and done to writing.

2. Define the principal terms employed in Electricity. Explain the Theories of Dufay and Franklin.

3. The various means by which active Electricity is manifested; with drawings of Apparatus and concise explanations of remarkable points of Theory.

Digitized by Google

4. Show that you can use the Apparatus which you have mentioned, by performing a few leading experiments illustrative of the Effects of Electricity.

5. If a Lightning Conductor is to be fixed to your house, what precautions should be observed?

6. During a thunderstorm the report and the flash were observed at the same moment; shortly afterwards there was an interval of three seconds between the two; and again of nine seconds between them. What do you conclude from these facts? Why?

7. What are the best means of Safety in a violent Thunderstorm?

8. What is the difference between Sheffield Plate and Electro-Plate?

9. How are engraved Copper Plates, Medals, and Statues multiplied by Voltaic Agency?

10. Explain the principle of the Electric Telegraph.

11. A doctor having ordered the application of Galvanism to a friend, how would you administer it, in the unavoidable absence of a Medical Attendant?

12. A Conversational Recapitulation of the whole subject, with historical recollections of a few of the most important discoveries.

Course IV.

CHEMISTRY.

A General View of the Elements.

The various objects of sense appear to be innumerable, but the ingredients which compose them are comparatively few—not more than 62, and probably far less. To discover the composition of bodies two modes are adopted, Analysis and Synthesis. The Elements have been variously classed according to the knowledge and opinions of different chemists. Hence we have Metallic and Non-Metallic Elements, Combustibles and Supporters of Combustion, Electro-Negative Elements and Electro-Positive Elements.

The most important properties of the principal Elements will be exhibited and explained; and that the succeeding Lectures may be clearly understood, the Pupil will be made acquainted with the great leading classes of Compounds.

Digitized by Google

The Laws of Combination.

Chemical Combination is distinct from Mixture and Cohesion. It requires the presence of at least two substances; and these are united so intimately that the properties by which they were distinguished disappear, and a new body is produced. The substances which constitute a Mixture are not in union; no compound is the result. Cohesion implies Union, but not the union of two bodies, but of the various particles of the same body. Cohesion gives form and density, but has no power to generate positively new substances. Some bodies are distinguished by their beautifully regular forms called crystals.

The union of two or more Elements produces a Compound. Some bodies cannot be made to unite, while others seem to have a great affection for each other. Preferences are frequently exhibited.

Though some bodies unite in any proportion, and others in any proportion up to a certain point, it is a general law that the Combining Proportions are definite. Several Compounds may frequently be formed from the same Elements in different proportions, and these proportions are generally with respect to one of the Elements double, triple, or some simple multiple of the first or lowest proportion. When two bodies combine separately with a third, so as to form two distinct compounds, the numbers which indicate the proportions in which they combine with the third body, likewise indicate the proportions in which they combine with each other.

The Elements and their Combining Numbers.

Aluminum	13·7	Columbium	92·
Antimony	129·	Copper	31·7
Arsenic	75·	Didymium	49·6
Barium	68·5	Erbium	?
Bismuth	71·	Fluorine	18·9
Boron	10·9	Glucinum	26·5
Bromine	80·	Gold	197·
Cadmium	56·	Hydrogen	1·
Calcium	20·	Iodine	127·1
Carbon	6·	Iridium	99·
Cerium	47·	Iron	28·
Chlorine	35·5	Lanthanium	47·?
Chromium	26·7	Lead	103·7
Cobalt	29·5	Lithium	6·5

Digitized by Google

Magnesium	12·2	Selenium	39·5
Manganese	27·6	Silicon	21·3
Mercury	200·	Silver	108·
Molybdenum	46·	Sodium	23·
Nickel	29·6	Strontium	43·8
Niobium	?	Sulphur	16·
Nitrogen	14·	Tellurium	64·2
Norium	?	Terbium	?
Osmium	99·6	Thorium	59·6
Oxygen	8·	Tin	59·
Palladium	53·3	Titanium	25·
Pelopium	?	Tungsten	95·
Phosphorus	32·	Uranium	217·2
Platinum	98·7	Vanadium	68·6
Potassium	39·2	Yttrium	32·2 ?
Rhodium	52·2	Zinc	32·6
Ruthenium	52·2	Zirconium	22·4 ?

The Effects of Chemical Action.

Chemical Action may be recognized by its Effects; the most remarkable of which are Change of Density, Odour, Taste, Colour, and Temperature, together with the evolution of Light and Electricity. Connected with these Effects are several of the most valuable of the Arts of Life, as Bleaching, Dyeing, the Detection of Poisons, the preparation of Medicines, and the solution of many useful problems in Domestic Economy.

The Composition and Properties of several important Compounds.

1. Air.—Oxygen and Nitrogen are the essential Elements of air. The chemical phenomena in which air is concerned, particularly Respiration and Combustion, depend upon Oxygen, the presence of Nitrogen being requisite to moderate the action, which would otherwise be excessive. Air is vitiated by Respiration and Combustion, because a portion of its Oxygen is appropriated, and compounds are formed which cannot produce the effects in which pure air is concerned.

There are other compounds of Oxygen and Nitrogen, as Nitrous Oxide, Nitric Oxide, Nitrous Acid, Nitric Acid.

2. Water.—Natural waters are impure, containing Air, Carbonic Acid, Chalk, Sulphate of Lime, or other substances.

Digitized by Google

Distillation is the best means of purification, but for many purposes exposure to air, or boiling, or the addition of a Chemical preparation may be employed, according to the nature of the impurity. Pure water is composed of Oxygen and Hydrogen. The principal characteristics of Hydrogen are Lightness and Inflammability.

2. ACIDS.—Acids are known by their taste, and by their turning vegetable blues to red. They were formerly considered as essentially compounds of Oxygen, which was hence denominated the acidifying principle; but it is now known that there are Acids without an atom of Oxygen. The principal Oxygen Acids are Sulphuric Acid, Nitric Acid, Carbonic Acid, and Phosphoric Acid, together with the vegetable Acids, as Citric Acid, Tartaric Acid, Acetic Acid, and Oxalic Acid. Muriatic Acid does not contain Oxygen.

4. ALKALIS.—Alkalis are known by their peculiar taste, by their turning vegetable yellows to brown, and by the ease with which they combine with Acids. The principal Alkalis are Potassa, Soda, and Ammonia—the first two being Metallic Oxides, and the last a compound of Hydrogen and Nitrogen. The Alkalis are used in the manufacture of Glass and Soap, and the preparation of many useful medicines.

5. EARTHS.—Earths are Metallic Oxides forming the connecting links between Alkalis, and the Oxides of common Metals; Lime, Magnesia, Alumina, and Silica, are the most important.

6. SALTS.—Salts are formed by the union of Acids with Alkalis, Earths, or any kind of Metallic Oxide. The Nomenclature of these compounds is so ingeniously arranged, that the name of a Salt indicates its composition.

THE COMMON METALS.

Metals are rarely found in a pure or native state; they are almost always in union with Oxygen, Sulphur, &c. To free them from these and from the rocks to which they are attached, they are submitted to a variety of operations Mechanical and Chemical. Metals are distinguished by their Density, Opacity, Lustre, and Tenacity; they are conductors of Heat and Electricity, and they readily combine with Oxygen and many other bodies. When Metals unite with one another, they form compounds called

Digitized by Google

Alloys, the most interesting of which are Tin-plate, Brass, Bronze, Pewter, Fusible Metal, and Gold and Silver Coin. When one of the Metals is Mercury, the resulting compound is styled an Amalgam, as the Silvering of Mirrors.

Vegetable and Animal Substances.

The proximate principles of Organic nature are numerous, but the ultimate principles are comparatively few. The complete development of Organic Chemistry is beyond the reach of an Elementary Course, but the treatment of the following items will, it is hoped, give the pupil some idea of its most interesting objects. Albumen, Fibrine, Caseine, Gelatine, Fats and Oils, Starch, Sugar: Fermentation; Wine, Beer, Spirit, Vinegar, Bread: Lignine, Gum, Resin, Colouring Matter, Acids and Alkalis. Nutriment and Respiration. The Changes that occur after Death, and the means by which they may be modified and retarded; the preservation of articles of food. The Grand Circulation of Nature—from the Mineral to the Vegetable, from the Vegetable to the Animal, and from the Animal back again to the Mineral.

Questions and Exercises.

1. A conversational Examination on the first Division of the Course.

2. Written Definitions of the following terms, with illustrations of their proper application:—Element and Compound, Analysis and Synthesis, Electro-Negative and Electro-Positive Elements, Combustibles and Supporters of Combustion, Metallic and Non-Metallic Elements, Affinity, Native Metal, Alloy, Amalgam, Oxide, Chloride, Iodide, Fluoride, Sulphuret, Carburet, Phosphuret.

3. A concise Outline of the Laws of Combination.

4. The Composition of Air and Water, and the properties of their Elements.

5. Explain and illustrate the nomenclature of Acids and Salts, employing as illustrations the substances in common use.

6. What is meant by the Proximate and Ultimate principles of Organized Bodies?

7. Be prepared to give a short account of the Organic substances mentioned in the Lectures, particularly such as are connected with domestic affairs.

8. Give the substance of the Lectures on Nutrition and Respiration.

Digitized by Google

9. A concise Essay on the Preservation of Animal and Vegetable substances.

10. Mention, and be prepared to explain, twelve practically useful applications of Chemical knowledge; and let six of them relate immediately to Domestic Economy.

III. ASTRONOMY.

Introduction.

Preliminary Definitions of the Astronomical, Geographical, and Geometrical Terms in common use.

A General View of the Heavenly Bodies. Apparent motions by day and by night. Planets and Fixed Stars.

The System of the Universe, as taught by Pythagoras and Ptolemy. Advances since their days. Telescopic Revelations.

Ideas of the Distance and Magnitude of the Heavenly Bodies.

The Earth.

The Figure and Magnitude of the Earth. The Motions of the Earth. Day and Night. The Ecliptic. Equinoxes, Zodiacal Signs. The Seasons. Time. The Atmosphere and its Effects.

The Moon.

Her Diameter, Distance, and Motions. Her Phases.

The Sun.

His distance from the Earth. His Magnitude. Is the Sun a Ball of Fire? His Spots. His Motion.

The Planets.

The Inferior Planets Mercury and Venus.

The Earth and its Moon. Eclipses. Tides.

Mars. The Minor Primary Planets. Jupiter and his Moons. Saturn, his Rings and his Moons. Uranus and his Moons. Neptune and his Moon. Comets.

The Fixed Stars.

Some of the most remarkable Constellations. The Zodiac. The Milky Way. Clusters of Stars and Nebulæ.

Digitized by Google

Questions and Exercises.

1. Define the following terms, and show their application by Diagrams and Maps, by the blank Slate Globe, and by appeals to Nature:—Planets and Fixed Stars. Great and Small Circles. Degree. Axis. Pole. Zenith and Nadir. Perpendicular and Vertical. Azimuth. Altitude. Sensible and Rational Horizons. Equator. Latitude of a Place. Zones. Ecliptic. Zodiac. Signs. Meridians. First Meridian. Equinoxes. Solstitial Points. Longitude of a Place. Latitude and Longitude of a Star. Right Ascension and Declination. Aphelion. Perihelion. Apogee. Perigee. Opposition. Conjunction. Quadrature. Node. Amplitude. Parallax. Aberration. Eclipse. Transit. Precession of the Equinoxes.

A few of the above will be taken at a time, and when the whole Exercise is complete, it may be copied out alphabetically for the sake of reference.

2. As the Course advances record, in a tabular form, the names and symbols of the principal planets, their diameters and distances, their rotations, and the times of their revolutions round the Sun.

3. A conversational Examination on Day and Night, and the Seasons.

4. A Telescopic View of the Moon at different periods. Is she after the full or after the change? Why?

5. Learn from the Almanac the position of the Moon, and mark it day by day for a month on the Slate Globe. Compare what you do, as frequently as you can, with what you perceive in the Heavens.

6. Make a Diagram of the Phases of the Moon.

7. A few Telescopic Views of the Sun. What remarks have you to offer concerning what you have seen?

8. Repeat the fifth Exercise, substituting some of the principal Planets, as Venus and Jupiter, for the Moon. Notice the principal Stars that lie near the path of the Planets, and find out their names by inspecting a Chart or Globe.

9. An inspection of the Heavens, on a fine night, to discover the principal astronomical points and lines and the most conspicuous Constellations.

10. A Record of the Inspection on the Slate Globe.

11. What are Comets? Mention some of the most famous.

12. The Means of determining Latitude and Longitude, and of ascertaining the Meridian,—not upon the artificial Globe, but upon any spot on the surface of the real Globe.

Other Exercises will be given during the progress of the usual Lessons on Geography and the Use of the Globes.

Digitized by Google

IV. PHYSICAL GEOGRAPHY.

I. The Position of the Earth in the System of the Universe; its Form, Magnitude, and Density.

II. General Distribution of Land and Water.

III. Varieties of Surface; Plains, Table Lands, Valleys, Mountains.

IV. The Structure of the Earth; Stratified and Unstratified Rocks; Metals; the Mineral Treasures of Great Britain.

V. Circumstances which affect the Surface of the Earth; Action of the Air, Rain, Running Waters and the Sea, the Encroachment of Sands, the formation of New Islands, the Effects of Volcanoes and Earthquakes, and the progress of Civilization and the Arts.

VI. The Waters of the Globe; the Ocean, Seas, Lakes, Rivers, Springs, Mineral Waters.

VII. The Atmosphere; the Physical and Chemical History of the Air; Mist, Rain, Hail, Snow, Dew, Winds, Luminous Meteors.

VIII. Climate; the Circumstances which determine its Character. The Climate of England compared with that of other Countries. Places of fashionable Resort for Health and Recreation.

IX. Geographical Distribution of Plants and Animals.

X. Varieties of the Human Race; their Distribution over the Earth, their Condition and Prospects. The Physical Circumstances which are favourable to the advancement of Civilization. To what extent these Circumstances are present in our own Country.

Questions and Exercises.

1. Draw a Diagram of the Solar System.

2. What information do you possess concerning the Form, Magnitude, and Density of the Earth?

3. What is the Diameter of the Sun and Planets in Relation to that of the Earth?

4. From these Diameters how do you arrive at a knowledge of the size of the Sun and Planets as compared with that of the Earth?

5. State in a tabular form the proportions of Land and Water in the different Zones.

Digitized by Google

6. By what means did Philosophers obtain these numbers?

7. What District is more than 100 feet below the level of the Sea?

8. Mention the most remarkable Plains, their situation, extent, and peculiarities.

9. Describe some of the principal Table Lands.

10. Construct an Outline Drawing of the situation of Mexico and the surrounding District.

11. In what direction do many of the principal Mountain chains run? Is this universally true? Examples.

12. What is there peculiar in the direction of their steepest sides? Examples. Is this always the case?

13. The most lofty Peaks in the four divisions of the World—stating their situation, latitude, longitude, and height.

14. Of what use are Mountains?

15. What is meant by Stratified and Unstratified Rocks, and how are they supposed to have been formed?

16. Make a Diagram of the various formations.

17. Mention the principal Mineral treasures of Great Britain, their situation and uses.

18. Are you acquainted with any natural proofs of the Universal Deluge described in the Bible?

19. What effects are Air and Water producing upon the surface of the Earth?

20. How does Frost act in breaking down Mountain Masses?

21. Relate a few instances of the encroaching and retreating of the Sea.

22. State the substance of what was said concerning the Encroachment of Sands.

23. How are Coral Islands formed?

24. Mention the principal Active Volcanoes, and describe their effects.

25. When, and by what cause, were Herculaneum and Pompeii destroyed?

26. What theories have been proposed to account for Volcanoes?

27. Describe an Earthquake, and mention some of its most remarkable effects.

28. Are these circumstances sufficient to account for the present condition of the Earth, without having recourse to any hypothesis inconsistent with the Divine writings?

29. Give an account of the Creation and the Deluge as recorded in the Bible, with illustrations from the Natural Sciences.

30. What is the depth of the Ocean?

Digitized by Google

31. What is the chemical composition of the Waters of the Ocean?

32. How is the saltness of the Ocean accounted for?

33. Are you acquainted with any facts concerning the temperature of the Ocean?

34. How are Waves accounted for?

35. Explain the phenomena of Tides.

36. Mention the principal Currents.

37. Are not under Currents supposed to exist? Examples.

38. Mention the principal Seas and Lakes in the four great divisions of the Earth, and point them out on the Map.

39. Point out the principal Rivers and their sources.

40. How are Rivers formed, and what is the cause of their motion?

41. What is the origin of Springs?

42. Explain the phenomena of Boiling Fountains. An illustrative Diagram.

43. Enumerate the principal Mineral Waters and their localities.

44. Give the temperature of some of the principal Thermal Springs.

45. Give an Outline of the Physical and Chemical Characters of the Atmosphere.

46. What are Clouds? Draw the principal varieties.

47. How are Mists and Fogs produced?

48. How are Rain, Snow, and Hail formed?

49. Construct a Table detailing the mean annual quantity of Rain in at least six different latitudes.

50. Explain the theory of Dew.

51. Mention the principal causes of Wind.

52. Construct a table of the velocity of Wind.

53. Mention the principal Trade Winds.

54. With what luminous Meteors are you acquainted?

55. What are the fundamental principles and uses of the Barometer, the Thermometer, and other instruments for ascertaining the state of the Atmosphere? With drawings.

56. Mention the circumstances which determine Climate, with explanatory illustrations.

57. What is meant by "mean annual temperature," and how is it calculated?

58. Do you understand the meaning of "Isothermal Lines?" Relate a few of Humboldt's observations.

59. Can you relate the principal circumstances that characterize the climates of the different Zones?

Digitized by Google

60. Write a short essay on the climate of Great Britain.

61. What are the effects of Heat and Cold upon Vegetables and Animals?

62. How many species of Plants are at present known to Botanists; and in what proportions are they distributed among the principal divisions of the world?

63. A brief Essay on the Geography of Plants.

64. Draw up a Table of the number of living and extinct Animals.

65. Point out on the Map the natural habitations of the most remarkable Animals.

66. What parts of the Earth are destitute of Human Beings?

67. Is it more correct to say, with reference to Men, that there are different races, or different varieties?

68. In what respects, as to Complexion, Figure, Stature, and Mind, do the various nations of the world differ from one another? Be particular in giving a minute account of the most esteemed system of Classification.

69. What Geographical and Geological features are most favourable to civilization?

70. Mention the Geographical and Geological advantages of our Native Country.

The Treatment of Physical Geography embraces so many of the Natural Sciences, already investigated, that the Questions and Exercises have been made more than usually numerous to give the pupils an opportunity of testing the extent and accuracy of their attainments.

Digitized by Google

DIVISION IV.

PRACTICAL PHILOSOPHY.

I. MAN AS A PHYSICAL BEING.

Course I.

THE PRINCIPAL ORGANS AND THEIR FUNCTIONS.

Introduction.

The Science of Human Nature is more frequently neglected than any other branch of Study. This neglect produces an immense amount of misery and crime, and prevents the realization of many benevolent intentions of improvement and reform.

Man has a Material Body and a Spiritual Mind. The Mind consists of two Classes of Faculties, the Intellectual and the Moral. The various parts of this complex whole are mysteriously linked together by the Decree of an All-wise Creator, and subject to laws of His appointment. Punishment is sure to follow the violation of a law, whether we know that law or not. It is, therefore, our interest to become acquainted with ourselves and with the laws laid down for our government. It is, likewise, our duty; for how can we reasonably hope to fulfil the Divine Commandments, if we are ignorant of their Nature and Objects?

The importance of this subject is conspicuously displayed in the following Illustrations:—1. Education. This is properly the development and training of the whole nature; and yet how often is the attention of parents, teachers, and pupils, exclusively devoted to one favourite department, leaving the others to the hazardous treatment of circumstances. It is our duty to educate the Mind; but we must not neglect the body. In this life, the Mind can do nothing without the body, and the body is useless without the Mind.—2. Health. The state of our large Cities with respect to drainage and water, the construction of our houses

Digitized by Google

and public buildings, and our almost total disregard of sanitary precautions in a hundred other cases, plainly indicate a prevailing ignorance concerning these matters. Properly speaking, it is our duty, not only to cultivate our minds and to perform deeds of charity and justice, but to maintain and improve our physical health, and to remove or avoid the sources of physical disease by all the means which are placed within our power. Some appear to treat the body as unworthy of serious notice. Surely they do not know the extent of its influence over the Rational and Moral faculties, nor do they recollect that He who made the spirit made the body also.

1. THE OSSEOUS SYSTEM for giving form and solidity to the Body.
2. THE MUSCULAR SYSTEM for communicating Motion.
3. THE DIGESTIVE ORGANS for the Conversion of Food into Blood.
4. THE ORGANS OF CIRCULATION for completing the formation of Blood, for carrying it over the body, for purifying it when corrupted by use, and for generating animal heat.
5. THE NERVOUS SYSTEM for imparting life and vigour to the various Organs, the source of Sensation, and by a certain influence over the Muscles, exciting them into action so as to produce Voluntary and Involuntary Motion.
6. THE SKIN enveloping and protecting the whole, and performing other important duties, as helping to remove impurities from the system, and moderating the temperature of the body.

NOTE.

Instead of the *Questions and Exercises* hitherto appended to the various Courses, the Pupils in this Division are requested to draw up from their Notes, and with the assistance of this Syllabus, concise and accurate *Reports of every Lecture*, to correct them by reference to some established authority, and lastly, to compare them with the recapitulation that invariably connects one Lecture with another. Occasionally, at the close of an important subject, a *Conversation* will be held upon its most interesting points, particularly such as are capable of practical application; and at the end of every Course there will be a *Voluntary Examination* for the satisfaction of those who wish to test their proficiency. Pupils who put down their names for the Voluntary Examination may submit their Reports to the Lecturer.

Digitized by Google

Course II:

THE GREAT NECESSARIES OF LIFE,

AND THEIR

RELATION TO HEALTH AND DOMESTIC ECONOMY.

Introduction.

Pain and misery are inevitable; but a great deal of what we suffer may be clearly traced to our own ignorance or the ignorance of those with whom we are connected. The Almighty has intrusted to our care a piece of delicate Machinery, expressly intended to act in a certain way, and under certain conditions. It seems strange that it should still be necessary to advise people to make themselves acquainted with that Machinery and its mode of action, and to press upon them the importance of learning something of those conditions which the Wisdom of God Himself has appointed.

The consequences of this neglect are copiously exhibited in individuals, in private families, and in public administrations. To Females this kind of knowledge is particularly valuable, and if the public mind were properly enlightened respecting it, it would be deemed a necessary branch of Female Education. To Men belong the active employments of life, to Women are intrusted Home duties; and as the former receive careful instruction to qualify them for their department, so should the latter. What is commonly called experience often comes too late, and is not unfrequently more advantageous to others than to ourselves. Science is nothing less than the results of the most trustworthy experience, accumulated for ages, and reduced to order for the benefit of those who do not wish to rely wholly on themselves. The advantage of actual practice is not denied; but surely the practice that commences on a foundation of knowledge is more likely to reach a satisfactory result than that which begins in ignorance, and has to work its way through a mass of prejudice and error.

The Course will be divided into the following Sections:—*Air, Warmth, Light, Food, Cleanliness, Exercise, and Rest.*

AIR.

Air is necessary to Life. Without Air Respiration is impossible, and therefore Digestion cannot be completed, the Blood cannot be purified, and Animal Heat cannot be maintained. The supply of Air must be abundant; it must not be vitiated by solid

Digitized by Google

or fluid impurities; it must not be too hot or too cold, too dry or too moist.

Air is vitiated by Respiration and Combustion, Carbonic Acid being produced in both cases. This is naturally a heavy gas, but being warmed by these processes, it rises to the upper part of our rooms, where it gradually accumulates till it is sufficiently abundant to pass up the chimney through the usual opening. Without a fire place the case is still worse.

Ventilation removes the foul heated Air of Respiration and Combustion, and introduces fresh pure Air. The first object is attained by the erection of a ventilating shaft, or by making a hole in the chimney, and fitting it with Arnott's Valve. The second object is secured by perforations communicating with unused Air, arranged so as to avoid draughts of cold Air sweeping along the floor, descending upon the head, or cooling the Carbonic Acid that is above. The grate should communicate with the external Air.

Other sources of impurity. Air is often loaded with particles of dust, or with noxious gases resulting from animal and vegetable decomposition, or the processes of certain unwholesome trades and occupations. These evils may be removed or mitigated by the application of science and common sense. Cleanliness in and about the house, good drainage, and plenty of water will do a great deal towards keeping the air pure. The offensive practices of neighbours may be corrected by law.

Errors and Neglects. Breathing the same air over and over again in closed rooms and carriages; covering the mouth and nose with a thick handkerchief; sleeping in a four-post bedstead closed on every side so as to produce the effects of a closet or large box; economizing space by putting Work Women on shelves; building Galleries so near the ceiling, that the people who are in them are compelled to breath the poison that is sent up by the people below; admitting cold air at the upper part of a crowded room under the impression, that the foul air will escape through it; throwing things out of sight into rubbish holes and dust binns, and generally overlooking the condition of cellars and basement offices; leaving drains, gully holes, sinks, and waste pipes untrapped or out of order; allowing servants to remove the bells from traps; draining into cesspools, or through open drains, or into rivers that supply towns with water; burying the dead in large cities, or in vaults under churches.

Consequences. Impure Air gives rise to Mental and Bodily Weakness, Scrofula, Typhus and other Fevers, a disposition to receive Morbid Impressions, Cholera, Consumption, and Premature Death.

Digitized by Google

WARMTH.

SOLAR HEAT. The phenomena of Solar Heat, the circumstances that determine Climate, and the effects of heat and cold on the corporeal and mental faculties have been already discussed in former Lectures. Excessive heat and excessive cold are equally destructive. Habitable districts with extreme climates are less favourable to health than more temperate regions. But, even in these last, the alternation of Summer and Winter, the changes which are continually recurring from heat to cold and from cold to heat, and the influence of geographical and topographical position, produce effects which it behoves us to study for our safety and comfort. England is a small country, but it has several climates, a correct knowledge of which is of the greatest use in the preservation of health and the cure of disease. Where change of climate is desirable, but cannot be had, Science endeavours to find a substitute. The rich are supplied with the luxury of a Madeira Room, and almost all can enjoy the still greater luxury of a Respirator. *Caution*:—They who think themselves delicate should consult a medical friend before they adopt extraordinary precautions, lest the measures which their fears suggest bring upon them the evils they dread.

ANIMAL HEAT is caused by the slow combustion of Respiration. When the circulation is quick and vigorous, Animals have warm blood; but when the circulation is slow and feeble, they have cold blood. The temperature of Man is 98° in every part of the world. Stimulating food, exercise, and cheerfulness, quicken the circulation and increase the production of heat. Insufficient food, indolence, and depression of Mind, retard the circulation, and diminish the production of heat. In infancy, in old age, and in the delicacy of broken health, it is very difficult to maintain the proper temperature. In feverish excitement, when the pulse beats high, and the cooling influence of the skin is checked, the heat increases in proportion.

CLOTHING prevents the dissipation of heat; the heat is in ourselves. A warm and a cool dress have the same temperature; they differ in conducting power. Wool, Fur, and Feathers are warmer than Silk, Cotton, and Linen, because they are worse conductors of heat. Air is a very bad conductor, and hence, in some measure, the warmth of Blankets, Flannel, and other loose fabrics. Leather, Indian Rubber, and Gutta Percha, are also bad conductors; the last two are impervious, a valuable quality, which is, however, sometimes detrimental.

Digitized by Google

General Rules with respect to Dress. It should keep the body moderately warm without overheating it wholly or partially. The Chest, the Arms, the Legs, and the Feet should be well protected. Pressure should be carefully avoided, particularly with growing children. The dress should be formed so as to permit the utmost freedom of motion.

Errors and Neglects. Wearing Fur Capes, Muffs, and Boas in moderate weather; sleeping in beds, and under bed clothes that are too warm and relaxing; wearing waterproof articles during violent or prolonged exercise; exposing the chests and extremities of children under the idea of making them hardy; wearing thin shoes; coming into the cold air from a heated ball-room with no other covering than the usual dress; supposing that young persons require "support" in the form of corsets and bandages; imagining that compression improves the shape, and that it does no harm: interfering with the use of the arms by shoulder straps, by low dresses that impede the action of the shoulder joints, and by cutting the arm holes too small and in the wrong place; wearing tight wristbands.

The frequent consequences of the above errors are Curvature of the Spine and other Deformities, Coughs, Colds, Croups, Consumptions, Cold Hands and Feet, Chilblains, Indigestion, Headache, Hysterical and Nervous Affections, and general Debility.

ARTIFICIAL HEAT is commonly obtained by the combustion of Wood, Charcoal, Coal, and Coke. Naphtha and Spirit of Wine are sometimes employed, and Gas has been recently introduced as a means of warming and cooking. The composition of these bodies is, in some respects, very similar. In burning they all produce Water and Carbonic Acid; and Charcoal yields, in addition, a great deal of Carbonic Oxide, a very poisonous gas.

If we wish to employ combustion with the greatest advantage to ourselves, we must be careful to provide a proper combustible, to feed it with its needful supply of air, to carry away the products of the process, and to conduct the whole operation so as to ensure the required temperature at the smallest cost and with due regard to health, safety, and convenience. With these objects in view, the following subjects will be considered theoretically and practically:—open grates; smoky chimneys; close stoves, Arnott's stoves, gas stoves; charcoal stoves without flues; kitchen ranges, ovens, boilers, and steam apparatus; hot air and hot water apparatus for halls, staircases, and green-houses; laundry furnaces and coppers, drying closets, &c.

Digitized by Google

Errors and Neglects. Allowing the fire to rob the room of its best air, and to keep up a perpetual cold foot-bath; hermetically sealing a room, and then complaining of headache, depression of spirits, a dull fire and a smoky chimney; subjecting the body to frequent changes of temperature by warming the sitting room too much in comparison with other parts of the house; breathing a dry overheated atmosphere, and providing similar fare for the plants in the green-house; placing a flueless stove in a sitting or bed room; neglecting to inspect and clean the kitchen boiler; being without hot water at any time, day or night.

Means of Cooling. Temperature is reduced by Radiation, Convection, Conduction, Liquefaction, and Evaporation, the consideration of which will explain many important facts and useful applications, as the Construction of Ice Safes, the art of preserving and applying Ice, Freezing Mixtures for cooling Wine, &c., Butter Coolers, the Sensation of Cold on entering a cold room, or sitting near a closed Window, or standing on Floor Cloth, or remaining in damp clothes, even before a fire.

Among the *consequences* of neglecting the precautions suggested by a knowledge of the phenomena of Artificial Heat and the Means of Cooling, may be mentioned Comfortless Rooms, occasioning Headache, Cold Feet, Coughs and Colds, Rheumatism, the risk of many serious disorders of the Respiratory and Digestive Organs, suffocation, accidents from fire, the bursting of the Boiler, the waste of fuel, the smoky atmosphere of large towns.

LIGHT.

Solar Light. Though Light is chiefly concerned in Vision, it is an energetic agent in other respects. Chemically, it promotes Combination and Decomposition. Vitally, it is a powerful stimulant to Vegetables and Animals. Deprived of Light, the Organic functions are imperfectly carried on, and strength and vigour soon decline. In man the effect of Light is very obvious: it quickens the circulation; it exerts a very decided influence over the biliary secretion; it excites the skin into healthful action, and is, in many respects, a friend to personal beauty; while, mentally, it arouses the intellectual faculties, and promotes cheerfulness and good-humour. People who live in dark streets and houses confirm these remarks, and so do those who habitually turn night into day, and day into night, in the pursuit of pleasure. In many respects, Artificial Light is but a sorry substitute for the light of the sun.

Digitized by Google

ARTIFICIAL LIGHT. The principal substances employed for this purpose are Wax, Oils of various kinds, Fat and Essential, Animal and Vegetable, Solid and Fluid, and Carburetted Hydrogen Gas. Their composition, the theory of their Action, and the Sanitary precautions to be observed respecting them, have been already explained. Their domestic application, their management, their advantages, their disadvantages, and their relative value, will be exhibited under the three heads of *Candles, Lamps, and Gas.*

Errors and Neglects. Living in dark and gloomy streets, or in houses that are not properly supplied with windows; making no provision for the removal of the air vitiated by lights; using substances that evolve noxious gases and vapours in addition to the usual products of combustion; working or reading by a light that is too strong or too feeble, or one that is continually varying in its intensity and its distance from the eye.

Consequences. Affections of the Digestive and Respiratory Organs; inflammation of the Eyes; impaired Vision.

FOOD.

USES OF FOOD. Food has two duties to perform;—to supply Materials for growth and repair, and to provide Fuel for the maintenance of animal heat.

COMPOSITION OF FOOD. Food must contain all the Organic Elements in due proportions. As no one substance answers this condition, the diet must be varied. The pure Elements will not answer the purposes of food. Nature requires certain proximate principles which she extracts from various complex compounds. Proximate Principles containing Carbon, Oxygen, Hydrogen, and Nitrogen, are called Nitrogenous or Plastic Principles. Proximate Principles containing Carbon, Oxygen, and Hydrogen, are called Carbonaceous or Respiratory Principles. The former supply the building materials, the latter the fuel. Associated with these Proximate Principles are certain mineral substances, which must also be deemed essential. To these may be added a fourth Class, comprising several substances that are valuable Accessories, if not absolutely necessary.

Classification of Alimentary Principles.

I. Nitrogenous or Plastic Principles.

1. Albumen.
2. Fibrine.
3. Caseine.
4. Gelatine.

Digitized by Google

II. Carbonaceous or Respiratory Principles.

1. Fat.
2. Starch.
3. Sugar.
4. Spirits.
5. Gum.

III. Mineral Essentials.

1. Sulphur.
2. Phosphate of Lime.
3. Chloride of Sodium.
4. Various other Salts.
5. Oxide of Iron.
6. Water.

IV. Useful Accessories.

1. Acids. 2. Essential Oils. 3. Alkaloids.

After this Preparatory View, the following substances will be examined with respect to their Value as Articles of Food.

Animal Food.
1. Milk, the Natural Model; Butter, Cheese.
2. Eggs.
3. Mutton, Beef, Venison, Hare.
4. Lamb, Veal, &c.; Bones, &c.
5. Pork, Geese, Ducks, and fat Meats.
6. Poultry and Game Birds.
7. Fish and Shell Fish.

Vegetable Food.
1. Wheat, the Natural Model; Bread. Barley, Oats, Rye, and Indian Corn.
2. Peas and Beans.
3. Sugar of different kinds.
4. Potato, Rice, Sago, Arrow Root, &c.
5. Turnip, Carrot, Parsnip, Jerusalem Artichoke; Pumpkin, Vegetable Marrow.
6. Cabbage, Spinach, Asparagus, Sea-Kale, Artichoke.
7. Onion, Leek, Garlic.
8. Olive Oil, Almond and other Fat Oils.
9. Fruit, Sweet and Acidulous; Rhubarb. Nuts.
10. Salads; Lettuce, Mustard, Cress, Water Cress, Endive, Celery, Radish, Beet, Cucumber.

Condiments. Salt, Vinegar, Peppers, Spices, Flavouring Herbs.

Drinks.
1. Water; Mineral Waters.
2. Tea, Coffee, Chocolate.
3. Wine, Beer, Ardent Spirits.

Digitized by Google

To render this part of the Course as useful as possible, the cost of every article is mentioned, likewise the marks by which it should be chosen, and the means by which imperfections and impurities may be detected. The Pupils are requested to make themselves practically acquainted with the illustrations submitted to their examination.

THE PREPARATION OF FOOD. The value of an article of food depends almost as much upon its preparation as its composition. The best food badly cooked loses a large portion of its nutritive power, and is not unfrequently converted into a positive poison. Every mistress of a family should study Cookery not merely as an Empirical Art, founded upon rules without reasons, but as an intelligent application of Chemical and Physiological Knowledge. The operations of Cookery will be explained in the following order:—Water; Simple infusions and decoctions; Vegetables; Boiling; Soup Making; Stewing; Broiling; Roasting; Baking; Frying; Culinary preparations for the sick room.

Other Conditions. The best food and the best cookery are not the only essentials. The preservation of health depends upon many other conditions, the principal of which will be treated under the following heads:—The Quantity of Food taken; the Time and Number of Meals; the influence of Age, Sex, Temperament, Habits of Life, and General Health; the effects of Heat and Cold, Air, Dress, Bodily Exercise, and Mental Excitement.

THE PRESERVATION OF FOOD. The chemical changes which succeed the death of a plant or an animal, may be retarded by Cold, by the removal of moisture, by the addition of Antiseptics, as Charcoal, Chlorine, Sugar, Salt, Alcohol, Vinegar, &c., or by the removal or decomposition of the Air with which the substance is in contact. The practical management of the various processes, their economical application in Domestic Economy, and their effects upon the health will be carefully explained. As Preserved Meats, Fruits, and Vegetables are often rendered unwholesome by an accidental failure of the process, or by the ignorant or fraudulent introduction of noxious adulterants, the principal sources of vitiation and the easiest methods of detection, will be pointed out.

Errors and Neglects. Living on Food too simple and uniform, or the reverse; feeding a Child on Arrow Root as an effectual substitute for its natural food; omitting Peas from Charity Soup; thinking gelatinous soups very nourishing, and that the glue com-

Digitized by Google

monly sold as portable soup is fit for human food; using too much Respiratory or too much Plastic food; giving children a stimulating diet "because at their tender age they require support;" taking large quantities of fermented liquors; thinking poultry and white meats easily digested; filtering Water under the idea that every impurity is removed; drinking tea that has become bitter and astringent; putting soda into the tea pot or into hard beer; purchasing ground coffee or coffee mixed with chicory; boiling a leg of mutton as if it were to be made into broth; boiling soups too much; roasting meat before a slow fire, or burning it on the outside and leaving it raw in the middle; giving a joint a bad flavour by allowing hot coals to fall into the dripping; eating fat stews, greasy pies, and hard indigestible hashes; cooking fish at too low a temperature; sending a patient fat broth, or beef tea that has been boiled a long time "to get all the goodness out;" keeping the digestive powers always at work under the conviction that it is best to eat a little and often; making the intervals between the meals too long; treating the strong and healthy as if they were weak and sickly, and the reverse; making no allowance for difference of age and other circumstances; drinking a quantity of cold water at and after meals; going into the cold immediately after a full meal; living generally in foul air, or under strong mechanical compression; making no difference as to diet between a warm climate and a cold one, or between Summer and Winter; taking violent exercise immediately before or after a full meal; persuading a person to eat against his inclination "because he is so very tired that he must want something;" going to bed immediately after a hearty supper and under great fatigue; fixing meals at hours that are likely to be disturbed by business engagements, or by any kind of strong mental excitement; eating too much sugar, sweet preserves, and chocolate; indulging too freely in vinegar, pickles, spices, and sauces; salting meat till a large portion of its nutriment has flowed into the salting tub; eating sausages and potted meats without carefully ascertaining their state; neglecting to procure sufficient knowledge to detect the adulterations so common in Water, Milk, Vinegar, Pickles, Preserves, Tea, Coffee, and other articles used every day; continually suffering under the effects of ignorance and mismanagement and taking no steps to remove the cause.

The Consequences of violating the Laws relating to food are very serious. Among them may be mentioned a few:—Fevers, Inflammations, Apoplexy, Gout, Indigestion, Headache, General

Digitized by Google

Debility and Sickness, a disposition to receive Morbid Impressions, Cholera, the loss of personal beauty and good temper, and a general corruption and deterioration of the whole system corporeal and mental.

CLEANLINESS.

Cleanliness is intimately connected with Health, and the neglect of it is the cause of many painful and disgusting diseases. The mind is influenced by the state of the body. Physical and Moral purity are often very closely associated. The skin has important functions to perform, and it cannot perform them in a satisfactory way unless it is kept clean. A dirty skin obliges other organs to do a portion of its work, and hence they are apt to get out of order from having too much to do. The habitually dirty are generally in a febrile state, from the unpleasantness of which they seek a partial relief by drinking, and in this manner many a drunkard has been formed. The bath is a great friend to temperance.

As Water and Soap are the best means of Cleaning, it is important that these should be of good quality, and in sufficient abundance. The best Water for Washing is distilled Water, but it is too expensive. Of the natural Waters, Rain Water and Artesian Well Water are the most profitable; River Water is generally good enough, but common Spring Water contains salts which decompose Soap, and are not unfrequently injurious in other respects. The pupils will be taught the art of testing waters, to discover their impurities, and to find out the means of correcting or removing their bad qualities. The common methods of Water supply will be explained, particularly that portion of them which is under the control of the mistress and her servants, as the well, the pump, the cistern and its appendages. Soap, whether for the house or the person, should be of the best quality, firm, soluble but not deliquescent, and having neither too little nor too much alkali. Fancy Soaps are generally inferior to the plainer kinds, and they are often adulterated. A rough towel or a brush assists the action of Soap and Water and encourages the circulation. The temperature of the Water should be cold in the morning and warm in the evening. The best authorities recommend the ablution of the whole body as highly favourable to health.

Baths are either Domestic or Medicinal: they may be either Cold, Cool, Temperate, Tepid, Warm, or Hot: they may be admi-

Digitized by Google

nistered in various forms, as by simple immersion, by shower, or in the state of vapour, or they may be confined to particular parts. The construction and management of Baths will be explained; also the best means of forming an extempore Bath when the regular apparatus is not at hand. Notwithstanding the value of Baths, there are many precautions respecting them which the strongest and most healthy cannot neglect with impunity. The weak and delicate should never enter upon a course of bathing without professional advice; for, supposing a Bath to be proper, serious errors may be committed as to its form, temperature, and duration, the period at which it should be administered, and the medical as well as domestic treatment that should accompany it.

The Hair and the Teeth cannot be kept in health without Cleanliness. Many of the Nostrums in the form of Washes, Oils, Dyes, and Powders, are compounded upon wrong principles, and are decidedly injurious to the objects they are intended to improve and preserve; a few of them will be examined.

A Clean House and Clean Clothes require no recommendation. It is not sufficient to make a house clean now and then; it should be kept clean. This requires the watchful care of the mistress, particularly in parts that are commonly out of sight. A few hints on this subject, under the heads of House, Furniture, and Plate, may not be amiss. *The Laundry* must likewise be considered; first, as to its construction, furniture, and fittings; and secondly, as to the process itself, and the materials that are employed.

Errors and Neglects. Confining Cleanliness to parts of the person, the house, &c., that are exposed to view; building a house without a bath room; taking a cold bath immediately after a meal, or remaining in it too long; administering a cold bath in cases of extreme debility or fatigue; remaining in a warm bath too long; brushing the skin too little and the hair too much; using, lotions, ointments, and other mysterious compounds for improving the skin and hair; cutting the hair too seldom, and letting the hair of children grow too long; neglecting the teeth, particularly in early life, or wearing them away by the use of hard gritty powders, or omitting to fill up the places of those which are lost; employing in the Laundry an inferior soap, impure water, or an excessive quantity of Potash or Soda, or of strong alkaline washing powders.

The Consequences of these Errors and Neglects are several obstinate Diseases of the Skin and other Organs; the encourage-

Digitized by Google

ment of Vermin; the premature Loss of Hair and Teeth; the evolution of Noxious Effluvia; the failure of Washing Operations; the wasteful expenditure of Money to little purpose; and, not unfrequently, the loss of Life itself.

EXERCISE.

Our Mental and Corporeal Faculties were given us to be used; if not used, or if used indiscreetly and without proper intervals of rest, evil must sooner or later occur.

Physical Exercise is either Partial or General. The Exercise of a part encourages the circulation in that direction, increases its nervous energy, and, if judiciously repeated, permanently augments its strength and vigour. In parts that are not used, or used but seldom, the opposite effects may be observed. Partial Exercise must be administered with great care; for although it imparts extraordinary power to the Organs employed, it not unfrequently does considerable mischief. General Exercise animates the Sanguineous and Nervous Systems, and prevents the torpor and lassitude to which the indolent are liable, without incurring the risks that attend partial Exercises. Whether partial or general, Exercise should be suited to the Age, Sex, Constitution, and habits of life; it should be had recourse to at proper times, and it should not be continued too long. Upon these principles, the Exercises commonly pursued by Ladies will be considered:—Walking, Dancing, Riding, Working, Drawing, Writing, Harp, Piano-forte, and Guitar playing, Reading, Singing, and various Recreative Games.

The Subject of Exercise involves, to a certain extent, that of *Dress*. The Pressure and Confinement of badly-constructed Dress interfere with the proper use of the Muscles, and render free and health-inspiring Exercise impossible. Many forms of Exercise, in themselves unobjectionable, are rendered injurious from the improper manner in which they are necessarily performed in consequence of the unwise arrangements of ordinary female attire.

Errors and Neglects. Neglecting to take a proper amount of active Exercise in the open air; repressing the joyous games of youth because they are too noisy; taking violent Exercise now and then by fits and starts; suddenly employing weak uneducated parts in duties that require matured and well-practised strength; reading and singing unskilfully, so as to distress the lungs unnecessarily;

Digitized by Google

adopting Exercises that are unsuited to age, sex, &c.; using the right hand too much and the left hand too little; constructing articles of dress so as to press upon, weaken, and prevent the legitimate use of important muscles; neglecting to notice and correct the faulty positions in which children frequently work, draw, write, &c.; making two children read, day after day, out of the same book, and in the same position; supposing that a loss of symmetry is nothing worse than an unpleasant appearance which the dressmaker can easily hide.

The Consequences of these Errors and Neglects are Nervousness, Hysteria, Indigestion, Loss of Appetite, Petulence of Temper, High Round Shoulders, Curvature of the Spine, and other deformities. The *Cure* of these is the business of the Medical Practitioner; their *Prevention* should be the study of the Mother. A well-informed Mother saves her children much suffering by banishing the most active promoters of disease; and when, from internal debility or some other cause beyond her control, disorders do occur in spite of her management, her knowledge enables her to see the beginnings of mischief; and she then applies at once and without delay for proper advice, and she intelligently carries out the treatment prescribed. Back Boards, Cooper Chairs, Dumb Bells, Springs, Straps, Bandages, and other contrivances for expanding the Chest and improving the shape, not unfrequently occasion irreparable mischief; the best of them require the utmost care, and some of them are positively injurious. The best Callisthenic Exercise for Ladies is the Sceptre Exercise, imported into this country from India, and taught for many years by Mrs. Johnson. When preceded by a preparatory Course, and accompanied by Exercises for the lower extremities and lessons in general deportment and Dancing, the requirements of health and taste are equally consulted. *Caution*:—No system of Callisthenics, however graceful and efficient, should be regarded as a substitute for out-door Exercise; the Lungs must do their work, for a considerable time every day, in pure fresh air, or the health of the strongest will be undermined.

Mental Exercise. The proper employment of the Mental faculties is conducive to health; but as the Mental faculties are compelled to use Material Organs, the laws which govern these Material Organs must be respected. We may use our minds too much, and without sufficient repose, and too much in one direction, or under the influence of violent or prolonged excitement, or when the body is not in a proper state for Mental labour; in

Digitized by Google

all of which cases we injure the health of important organs, and even run the risk of permanently deranging the functions of the brain.

Errors and Neglects. Using the Mind too little or too much, or too much in one direction; employing the Mind immediately after full meals, or at late hours, or under great fatigue, mental or bodily; applying artificial stimulants to force the Mind to excessive exertion; urging a Child to precocious attainments, that is, starving its body to feed its mind, in direct violation of God's Organic Laws; overlooking differences of Mental Constitution, and expecting all Children to excel alike in the same pursuits; neglecting bodily Exercise, that the Mind may have more time for improvement; working both body and mind in an excessive degree, and under the influence of extraordinary excitement.

Consequences. The loss of bodily Health and Vigour; premature Old Age; Mental Dulness; Educational Failure; the possession of great Attainments without the Power of using them.

REST.

Fatigue is naturally followed by Rest. Rest is either partial and imperfect, as in Sitting and Reclining, or it is general and complete, as in Sleep, when the Organs of Sensation and Voluntary Motion, and the various Mental Faculties, are in profound repose. The vegetative functions go on during Sleep, but with diminished activity; and hence they ought not to be embarrassed with unnecessary duties. The period required for Sleep varies with age, sex, temperament, warmth, &c. The arrangements of *the Bed-Room* as to temperature, ventilation, cleanliness, and other essentials, can never be neglected with impunity. When the Mind is not in perfect repose, excited faculties, more or less awake, give rise to *Dreams*, and, in extreme cases, *Somnambulism*.

Errors and Neglects. Not providing proper means for the muscular rest of delicate young people during the day; eating a hearty supper, and then going immediately to bed; sleeping too much or too little, too warm or too cold, or in damp beds, or in a confined and vitiated atmosphere; neglecting to expose the bed and bed clothes to the fresh air; sleeping in beds that are too short or too soft; using pillows that are too high; allowing two children to sleep, night after night, in one bed without making

Digitized by Google

them change sides; going to bed excessively fatigued in body and excited in mind.

Consequences. Unrefreshing Slumber without true Sleep; Feverishness and Headache; general Enervation and Debility; Indigestion; Nightmare; Frightful Dreams; Sleep Walking; Spinal Deformity; Coughs, Colds, Rheumatism, &c.

Course III.

ACCIDENTS AND EMERGENCIES;

OR WHAT TO DO IN CASES OF DIFFICULTY AND DANGER.

Many Accidents and Mishaps are the natural consequences of ignorance and carelessness; and although they can never be altogether avoided, it is in our power to diminish their number and severity to a very considerable extent. To prevent Accidents, we should learn the causes which generally give rise to them, and when, notwithstanding our precautions, they unfortunately occur, we ought not to be wholly unprepared to meet them. The moment for using knowledge is not the proper time for getting it.

In cases which demand medical or surgical skill, unprofessional persons should never undertake what are properly professional responsibilities, excepting under the pressure of extraordinary circumstances, and when delay is out of the question. To send for the Doctor should be the first thought; and in the meantime, should t be necessary to do something to relieve the sufferer, the friends should be careful to do neither more nor less than is absolutely required to ward off immediate danger, and to ensure the full benefit of the coming aid. Many cases, simple in themselves, have been rendered hopelessly complicated by Errors of Omission and Commission on the part of anxious but ignorant friends.

If these assertions are founded on truth, the Education of a Wife and a Mother is incomplete without some instruction in the nature and causes of Common Accidents, and the Measures that ought to be adopted in sudden Emergencies. With these objects in view, a few Lectures will be devoted to the following subjects:—

Digitized by Google

1. PRELIMINARY SUGGESTIONS. What a house contains, or ought to contain, for the treatment of sudden Casualties. Things which every Educated Woman ought to know, and be able to do.

2. MECHANICAL INJURIES from falls, blows, wrenches, sharp instruments, &c. In serious cases these are far beyond unprofessional treatment: but, as a great deal of harm may be done by ignorant but well-intended interference, care will be taken to show what friends may and ought to do and what they ought not to attempt. Attention will be drawn to the violent games and dangerous practises that frequently occasion these injuries. The arrangements of the play-ground will, likewise, be examined.

3. THE INTRUSION OF FOREIGN BODIES INTO IMPORTANT ORGANS. The removal of these often demands much more practical skill than a private person can pretend to; but there are certain facts which every Mother ought to know, particularly as there are some cases that may be easily relieved; and there are, moreover, foolish sports and bad habits which often lead to accidents of this kind.

4. SUFFOCATION. Hanging; Drowning. These calamities, though comparatively rare, are too serious to admit of the slightest delay. Medical advice must be procured at once; but the friends must not be idle. What ought they to do? Delay is Death, and so is mismanagement.

5. FIRE. The House; the Chimney; the Person; Boiling Water; Steam; Gas; Lightning. What to do in the way of prevention. When accidents occur, what should be done to meet them? Help may not be at hand, and then everything depends upon Knowledge, Energy, and Presence of Mind.

6. FROST. Though not so immediately fatal as Fire, Frost is very certain in its effects. Much skill is required to save those who have been exposed for some time to a low degree of cold. The treatment should be directed by a medical man; but this is not always possible.

7. FITS. These arise from different causes. What is done to a person in a fit till medical assistance can be obtained, is frequently and literally of vital importance.

8. PESTILENCES. Endemic, Epidemic, Contagious, and Infectious Diseases are very common. Their treatment by unprofessional persons is out of the question. There are, however, facts

Digitized by Google

connected with their history that every one should understand. Many of our domestic and social arrangements invite or encourage malignant diseases which are more easily prevented than cured.

9. Poisons. Choke Damp; Charcoal Fumes; the results of animal and vegetable decomposition. Poisonous substances in daily use in almost every house. How to detect common poisons. *Adulterations*, particularly such as are found in Articles of Food.

II. MAN AS A MENTAL BEING.

Course I.

THE INTELLECT AND ITS OPERATIONS.

It has been already mentioned that Man is a Compound Being, consisting partly of Matter and partly of Spirit, mysteriously linked together, acting and re-acting upon each other, in a manner at present unknown. Reason and Revelation concur in supporting this view of Human Nature. The Materialist, however, rejects the idea of Spirit, and attempts to explain the phenomena of Mind on the assumption that they are merely properties of Matter,—a dangerous doctrine directly contrary to the discoveries of Science, and obviously repugnant to the first principles of Morality and Religion. The Spiritualist teaches the reverse of this; but, in his anxiety to avoid the errors of Materialism, he not unfrequently runs into the opposite extreme, and pays too little regard to the modifying influences of our Material Nature. The Mind acts upon the Body, and the Body acts upon the Mind, as may be proved by a hundred every-day occurrences.

The Spiritual Mind cannot, in this life, act independently of the Body; it is obliged to employ the Body as its Material Organ or Instrument. A variety of evidence points to the Brain as the part that fulfils this duty. The Brain is the Material Organ of the Mind:—Not that the Brain perceives and reasons, hopes and fears; but that it is the physical Instrument which the Mind is compelled to use in this mixed state of Spiritual and Material

Digitized by Google

Existence. The knowledge of this connexion explains many important facts in the economy of Health and Education, and enables us to guard against some of the most frightful evils to which we are liable.

The Intellect will be examined in the following manner:—

I. THE PERCEPTIVE FACULTIES, which perceive the existence and properties of external Objects.

II. THE REFLECTING FACULTIES, which compare, and judge, and reason.

III. THE IDEAL FACULTY.

IV. LANGUAGE.

V. IMPORTANT COMBINATIONS AND MODES OF ACTION.

INTELLECTUAL OPERATIONS.

I. THE INVESTIGATION AND COMMUNICATION OF TRUTH.

The Word *Truth* has various meanings. It is here used to denote *the representation of things as they are.*

The investigation and communication of Truth are the noblest uses of the intellectual faculties. Scepticism would persuade us, either that there is an uncertainty in the nature of things, or that if there be a certainty, the human mind is unable to grasp it. To doubt is, therefore, true wisdom,—a melancholy doctrine, as unphilosophical as it is dangerous.

From the importance of this subject in an educational point of view, it will be considered somewhat minutely under the following heads:—

Ideas, Names, and Things denoted by Names—Propositions—Reasoning—Method.

IDEAS are of two kinds, Sensible and Mental; and these are Simple or Complex, Distinct or Indistinct, Adequate or Inadequate, Abstract or Concrete, Particular or General.

NAMES are General or Individual, Concrete or Abstract, Connotative or Non-Connotative, Positive or Negative, Relative or Absolute, Univocal or Equivocal.

THINGS DENOTED BY NAMES:—Mental Acts, Mind, Body, and the Attributes of Quality, Relation, and Quantity.

Digitized by Google

PROPOSITIONS. A proposition is an Assertion,—Something affirmed and denied of Something. It consists of three parts,—Subject, Predicate, Copula. Propositions are True or False, Affirmative or Negative, Simple or Complex, Universal or Particular, Absolute or Conditional. Definitions are either Nominal or Real,—Accidental, Physical or Logical.

Evidence. Belief rests upon Evidence, and this arises from two sources,—Intuition and Inference. Inference includes Demonstrative Evidence and Moral Evidence, the latter of which embraces Experience, Analogy, Testimony, and Probability.

Prejudices or Idols are prepossessions that darken the Judgment and bias its decisions. Lord Bacon mentions four Classes,—Idola Tribus, Idola Specus, Idola Fori, and Idola Theatri. In illustrating these mischievous sources of Error, particular attention will be devoted to those which produce the greatest evil in ordinary life and conversation.

REASONING. An Act of Reasoning expressed in words is called an Argument. When an Argument consists of three propositions, two Premises and the Conclusion, set forth in scholastic form; it is called a Syllogism. The Process is often called Ratiocination. Syllogisms are seldom fully stated, the use of two Propositions being generally preferred; but the omitted proposition is easily supplied. Syllogisms are very useful in testing the validity of arguments; but they cannot give us new truths, in the strict meaning of the expression. This is the business of Induction, which patiently collects facts and draws conclusions by a process denominated Generalization,—the extraction of a General Law from particular cases,—the very reverse of Syllogism, which argues, upon the Deductive plan, from generals to particulars. Induction supplies Syllogism with truths. Arguments are also said to be Analytical and Synthetical, à priori and à posteriori, Direct and Indirect.

Fallacies. A Fallacy is an unsound argument which appears to determine the question in hand when in reality it does not. When designedly employed to deceive, Fallacies are called Sophisms. Fallacies are generally dreaded in discussion; but they are far more common, and infinitely more dangerous, in the reasonings which we carry on within our own minds.

Digitized by Google

SYNOPTIC TABLE OF FALLACIES.

I. Fallacies of Simple Inspection. — 1. Fallacies à priori.

II. Fallacies of Inference.

1. From Evidence distinctly conceived.
   - 1. Inductive Fallacies.
     - 2. Fallacies of Observation.
     - 3. Fallacies of Generalization.
   - 2. Deductive Fallacies.
     - 4. Fallacies of Ratiocination.
2. From Evidence indistinctly conceived. — 5. Fallacies of Confusion.

METHOD includes three great objects,—the Acquisition, the Classification, and the Communication of Knowledge.

The Acquisition of Knowledge. The Application of Deduction to the truths obtained by Induction, and the subsequent Verification of the Conclusions, thus arrived at, by the test of Experience, form, together, the Grand Method of Scientific Investigation and Discovery.

The Classification of Knowledge. A mass of knowledge without order and arrangement is of little value. Classification is necessary, not only with respect to the Objects of Scientific Research, but as a means of storing up our ordinary experiences, so that they may be readily applied in the time of need. *A place for everything, and everything in its place,* has its mental as well as its material application.

The Communication of Knowledge. This may be as Information or Instruction, in the way of Narrative or Argument. In every case we must first know what we wish to communicate; Imperfect Knowledge begets error and confusion. Secondly, as Mind is to be acted upon, we should know what mind is, and, in cases of importance, we should make ourselves thoroughly acquainted with the individual Mind to be addressed. Thirdly, we should know the means by which Knowledge is best imparted. Both Analysis and Synthesis should be used. In teaching, the great art is to rouse the Mind, that it may get Knowledge, not merely as a passive recipient, but as an active agent.

CONCLUDING ADVICE. Cultivate a sincere uncompromising love of Truth: what you learn, learn well; be not satisfied with

Digitized by Google

what is *nearly* true. Avoid Credulity and Scepticism; they are both weaknesses. Never argue without a sufficient knowledge of the subject, or for the vanity of display, or against your convictions. Never ridicule another for having been wrong; the fear of ridicule prevents many from acknowledging their errors. Never deem yourself unanswerable because you are unanswered. Keep your temper, and be careful not to attribute improper motives. Review the arguments upon which you most frequently rely as your favourite weapons. Seek out and remove your prejudices; do not look for them so much in matters of science and learning, as in the common opinions and actions of daily life. Every Man, Woman, and Child reasons, or attempts to reason, every day—then why not learn to reason well?

II. Taste.

What is Taste? This question has been answered in different ways by Burke, Reynolds, Alison, and other authors, ancient and modern. The truth appears to be, that Taste is the result of a well-balanced Mind, the grosser elements of which are counteracted by those of a more elevating tendency. Bad Taste may be traced to the feebleness of an important faculty, or to its extraordinary strength and uncontrolled activity. Hence few, if any, can boast of universal Taste; for whose constitution is so nicely adjusted as to ensure in all things that perfect *discrimination* which is the characteristic of pure Taste? Taste has its moral as well as its intellectual aspect. The higher sentiments must be satisfied; when they are outraged, the utmost elegance and the most consummate skill are unable to palliate the offence. They are also useful in restraining the indulgence of Taste within the bounds of moral rectitude.

Is there among the objects of Taste a Criterion or Standard of Beauty,—a quality or set of qualities absolutely beautiful, possessed of which things are beautiful, and destitute of which they are not beautiful? This question will be answered by an appeal to what are called beautiful forms, colours, motions, &c., from which it will appear, that objects are esteemed beautiful, not because they possess certain fixed and definite properties that invariably command the approval of Taste, but because they are able to bear the scrutiny of a complex Mental Operation that not only regards the properties themselves, but investigates their relations, and dwells upon the intellectual and moral associations with which they are connected in our minds. A form that is beautiful in one case may be the reverse in another, and so on.

Digitized by Google

There are certain conditions which the Mind imposes, and if these are violated, the work is condemned as a work of bad Taste.

What these conditions are, and in what manner they operate, will be expounded under the heads of Design, Fitness, Proportion, Utility, and the Accidental Circumstances of Birth, Education, and the like.

Literary Compositions are liable to the same criticism which judges other forms of Art: and so are ordinary conversations, and various arrangements of domestic Life.

Course II.

THE FEELINGS AND THEIR MANIFESTATIONS.

The Feelings will be examined under three Divisions:—

I. The Inferior Feelings, or Animal Propensities—common to Man, and the Lower Animals.

II. The Superior Feelings, or Sentiments.

III. Important Combinations and Modes of Action.

It is probable that all the Faculties, included in this and the last Course, are present in every Mind, although, in most cases, many of them are too feeble to attract attention.

Some of the Faculties are frequently called *Evil*, and others *Good*. Properly speaking, they are all good when they obey the laws of God, and they are all evil when they violate those laws. The unrestrained indulgence of the Propensities leads to degradation and misery; but when controlled by the Intellect and the Sentiments, and under the influence of Christian principles, the Propensities are as valuable a portion of our Nature as any other. Indeed, they are indispensable. If Faculties are to be judged of by their abuse, not only the Propensities, but the Sentiments themselves, the pride and glory of our Moral Nature, must, in fairness, be called evil, because even they are extremely prone to err, in opposition to the known and acknowledged precepts of the Divine Teacher. *Good Deeds* are not necessarily good in the strict meaning of the word. How did they originate? From what motive did they spring?

Digitized by Google

A perfect Mind, perfectly educated, would possess all the faculties, intellectual and moral, in such degrees of relative strength as to afford mutual checks and safeguards against abuse. This perfection we are not, at present, permitted to reach; but it is, nevertheless, a Standard of Excellence which the Educator should endeavour to keep steadily before him.

The Faculties are unequally distributed at birth, and as their Education varies, according to circumstances, both in quality and extent, the original diversities and pecularities of Intellectual and Moral Character are still further increased and complicated. Some are remarkable for the acuteness of their Perceptions; others for the vigour and precision of their Reasoning, or for the facility with which they represent their ideas in elegant and expressive language. Some live under the dominion of the Propensities, and their characters are habitually low and selfish; others exhibit obvious indications of the Superior Feelings, struggling against the rule of selfishness with various degrees of success, either rising to the dignity of self-denying virtue, or yielding to the impetuosity of the lower feelings, at the same time gilding and refining their grosser manifestations, and producing that mixture of inconsistent motives and actions which is the too common characteristic of our race.

Temperaments have a great deal to do with Mental Manifestations, intellectual and moral. They are peculiar constitutional states, partly physical and partly mental, and are generally considered under four Classes,—the Lymphatic, the Sanguine, the Bilious, and the Nervous. It is seldom that an individual can be cited as an example of one pure unmixed temperament; combinations of two or more, with one predominating element, are more frequent. In self-development and in the education of others, the manifestations of temperament should not be neglected. The worst temperament is not hopeless, and the best requires careful treatment. Under the head of Temperaments may be explained the peculiarities of the Male and the Female Mind. The same Faculties may be discerned in both: the difference is attributed to Bodily Constitution and to the proportions of the Mental Elements, their strength and intensity, their delicacy and susceptibility. The Masculine and the Feminine Temperament may be seen in both men and women, sometimes nearly pure, but generally more or less mixed. There is a happy medium for men and for women—What is it?

Digitized by Google

Natural Theology.

This subject might have been introduced into the last Course, but, as it refers to many points of a moral nature, it has been thought better to give it its present place.

The existence of a God is the common and almost universal belief of mankind. A mere assent, however, is not sufficient; we ought to be able to give our reasons for the faith we profess, and then we are less likely to be led away by the fallacies of Infidels and Sceptics. Science is never displayed to so much advantage as when she is engaged in demonstrating the Existence and Attributes of the Divine Original.

The truth *there is is a God* may be established in various ways, of which the following are sufficient for our present purpose :—

1. The Physical Argument—in which events are traced to their causes, till we arrive at the First Cause, uncaused, self-existent, and eternal.

2. The Argument from final Causes—in which we come to the conclusion of a Great Original Designer, from the innumerable evidences of design which the Physical and Mental Worlds exhibit.

3. The Moral Argument—based upon that innate feeling of obligation and responsibilty, of which all are, in some degree conscious, and from which they can never altogether escape.

4. The Historical Argument—by which we are confirmed in our conclusion by the consideration that it has received the assent of all mankind, with a few exceptions, arising either from intellectual or moral destitution, or from the errors of a spurious philosophy.

The attributes of God are very numerous; but attention will be chiefly confined to the following: — Spirituality, Eternity, Infinity, Omnipresence, Omnipotence, Wisdom, Holiness, Justice, Love.

Of Atheism there are three kinds—Sceptical, Speculative, and Practical. The first and second are the results of Erroneous Reasoning, the principal fallacies of which will be exposed. The third is a moral anomaly, in which God is acknowledged in words, but denied in works; and this is by far the most frequent and dangerous form of Atheism.

The truths which Natural Theology unfolds are the most sublime that the unaided human mind can reach; but they are not sufficient for our wants. There are many things concerning

Digitized by Google

God and Man of which Natural Theology is necessarily silent;—such, for example, as the following:—the Triune Nature of God; the Creation of Man, his early history and his future prospects; the Requirements of the Divine Law, the Consequences of Disobedience, and the Means of Recovery and Salvation. These momentous subjects are intimately connected with the highest interests of mankind; and as reason cannot discover them, they are graciously revealed by God himself in the Holy Scriptures.

That a Divine Revelation is possible, there cannot be the slightest doubt, and when we consider the Character of God and the Condition of Man, we are led to the conclusion, that it is not only possible, but highly probable, and even necessary. A Revelation may be given immediately to every individual, or it may be delivered to Commissioners, to be by them published to the world. Of these methods, the latter is decidedly preferable, and hence it is the one selected. With respect to the mode of publication, a written document has so many advantages over oral communication, that we cannot be surprised, that the Word of God should be handed down to us in that manner. That the Scriptures, as we call them, are really the Word of God, can be proved by evidence the most conclusive and satisfactory. What that Evidence is, what are the Objections that have been urged against it, and by what Arguments these Objections have been answered, will be more completely exhibited in the department of Religious Instruction; but as the subjects referred to are of the highest interest, not only in themselves, but as illustrations of logical investigation, they will be reviewed as closely as time will allow. Narrow understandings dread Science as an enemy to Religion. Vain idea! Science and Religion are parts of one Whole, and that Whole is Truth. Spurious Science—a tissue of Assumptions founded on Prejudice and upheld by Fallacy—is as much opposed to Reason as to Revelation.

Digitized by Google

III. MAN AS A RESPONSIBLE BEING.

THE PRACTICAL DUTIES OF LIFE.

Introduction.

Is there a Standard of Duty, a settled rule by which to test our conduct, and determine our Course of Action? In answering this Question, some appeal to Self-Love, others to Reason, or to Conscience; but the only safe guide is the Word of God, recorded in the Works of Nature and Revelation. Whatever is sanctioned and commanded in God's Law, it is our duty to do: whatever is reprobated and forbidden in God's Law, it is our duty not to do. But are this doing and not doing intrinsically virtuous? Is every good deed absolutely good? Is every abstinence from evil necessarily meritorious? In morals we must consider, not only the act, but the motive from which that act arose. Acts apparently praiseworthy may spring from the most odious motives. Hence it is our duty, and therefore our interest, to submit the best portions of our conduct, those which are most highly applauded by ourselves and others, to the test of an impartial examination, that we may discover their moral value.

Duties are commonly divided into four Classes:—Duties to God—Duties to Ourselves—Duties to the Lower Animals—Duties to our Fellow Creatures. Each of these includes two genera,—Positive Duties and Negative Duties,—things to be done, things not to be done. Every Duty is connected with a Right; and, therefore, in considering Duties, we shall consider Rights also.

DUTIES TO GOD.

God is our Creator, our Preserver, and our Judge, in which offices He displays unerring Wisdom, unlimited Power, perfect Justice, and never-failing Benevolence and Beneficence. The contemplation of the attributes and offices of God suggests the Duties which we owe Him. As He is great and wise, He demands our veneration; as He is just, He requires our reverential fear; as He is benevolent and beneficent, He is entitled to our love and gratitude; as He is both wise and good, He claims our perfect confidence and unmurmuring submission.

Revelation confirms and sanctions the conclusions of Natural Religion, and unfolds truths which human sagacity and learning

Digitized by Google

could never have discovered. Revelation discloses the plan of Salvation, and introduces us to the Divine Person, who has taken upon Himself the office of Mediator, and who is emphatically the Way, the Truth, and the Life. With Revelation for our guide, our Duties to God will be expounded under two Classes :—

1. Devotional Duties—including Praise, Thanks, and Petitions.

2. Practical Duties—Learning God's Natural and Revealed Laws, and cheerfully obeying them.

DUTIES TO OURSELVES.

This is not a very happy expression. It implies Duties to Self as an isolated Being, and is often employed in the sense of Right, or as an apology for some act of Selfishness. Our Duties to ourselves are not confined in their effects to ourselves. We cannot stand alone. We cannot justly say, that any part of our character and conduct is strictly private and confined to ourselves. Everything that we say, or do, or think, renders us more or less able, or more or less willing, to discharge our relative Duties.

Our Duties to ourselves may be comprehended under two Divisions :—

I. Improvement,—Physical, Intellectual, and Moral.

II. The Enjoyment of Happiness.

With respect to the first, it is our duty—

1. To learn the Laws of our Physical Nature, and to obey them. Deformities, Fevers, Pestilences, and other serious ailments, commonly referred to accident or necessity, are frequently nothing more than the consequences of ignorance or vice. To preserve and improve our bodily health, by all the means in our power, is a sacred duty. With a sickly body, how can we attend to intellectual and moral calls? Are good intentions sufficient?

2. Intellectual culture should be diligently carried on, with due regard to the direction and strength of the various faculties, and to the influence of mental excitement upon the corporeal organs. The acquisition of knowledge belongs to this section. Knowledge is either Useful or Recreative. The Useful includes that General Knowledge of Science, Art, History, and Language, which every educated person is expected to possess, and that Special or Technical Knowledge which qualifies its possessor for one of the professions or callings of life. The Recreative embraces those objects that are not directly useful in the common acceptation of the term. Recreation is, however, not only useful, but absolutely necessary, as an occasional Refreshment of body and mind. There

Digitized by Google

are abuses in this as in everything else; but when Recreation is selected from proper sources, when it is pursued at proper times and under proper control, it is not only allowable, but it is a real and positive good—highly beneficial to ourselves and others.

The young are apt to think that Education terminates with the formal instruction of School. There cannot be a greater mistake. School may be given up, but Education goes on for good or for ill, for weal or for wo. Let the prudent parent direct its course. The Interval between School and Matrimony is too often wasted in idleness and frivolity; and, after Marriage, the idea of improvement is, in too many cases, absolutely abandoned as something entirely unnecessary. An immense amount of domestic misery may be traced to these two errors.

3. The *Moral Portion* of our Nature demands the closest attention; it is the most difficult to know, and the most important that it should be known. We should acquire just views of the dignity of the Moral Character. We should assiduously cultivate Piety and Benevolence; though directed immediately to God and to Man, and hence relative Duties, they benefit ourselves. *Conscience* must not be neglected. It is a complex Monitor, the principal elements of which are Piety, Benevolence, and Justice. Naturally, it is liable to err; it requires Education. As Christians, there can be no doubt concerning the foundation of that Education—*the one thing needful.* The following suggestions, however, may not be useless to a Juvenile Auditory. 1. Ascertain the actual state of the Moral Character. 2. Take the Standard of Scripture as the true test of Moral Actions. 3. Never accommodate principles to conduct; allow yourselves no excuses. 4. Be careful to criticize "the best parts of your character,"—particularly if they are always forcing themselves into notice; fictitious virtue is essentially theatrical. 5. Look at the mode in which your hours of leisure are spent. Recreation must be innocent and suitable. The secret thoughts must be pure. You have not a right to do what you please when you are alone; the effects of solitude are very powerful, not only on yourselves, but on others. 6. Practise frequent reflection and self-examination, not for the vanity of self-laudation, but to learn the unadulterated truth. Motives, as well as actions, should be scrutinized, and progress or the reverse should be accurately noted. 7. Inquire whether you love, as well as do your duty. A constrained obedience that would offend, but cannot or dare not, is not sufficient; it may be advantageous to yourselves and those with whom you are connected, but it is not virtue.

Digitized by Google

II. The Enjoyment of Happiness is a Duty in all cases that do not involve the breach of any other Duty. Happiness is a state of continued agreeable feeling. Pleasure is more intense and vehement; but it is temporary and evanescent. In what does Happiness consist? It does not consist in sensual gratification, in freedom from labour, or in the possession of wealth and rank. It consists in—1. Bodily Health and Vigour. 2. A well-trained and instructed Intellect. 3. Well-disciplined Feelings acting in harmony with the dictates of Reason and the precepts of Holy Writ. In a word, Happiness is the reward of Obedience to Law. Disobedience may have its attendant delights; but they are not of the kind to which we give the name of Happiness.

DUTIES TO THE LOWER ANIMALS.

The Lower Animals are provided for the use of Man; and Man enjoys, to a certain extent, a rightful authority over them; but he is not at liberty to visit them with needless cruelty. Barbarous experiments for the gratification of curiosity, without any reasonable prospect of good, and the infliction of lingering unnecessary pain, either through carelessness, or for diversion, gain, or any selfish reason, are utterly unjustifiable. Cruelty is often connected with ignorance; hence one of the advantages of the Study of Nature. Cruelty to the Lower Animals educates the inferior propensities, and prepares the way for the commission of offences still more abominable.

DUTIES TO OUR FELLOW-CREATURES.

By acting as we ought towards God and Ourselves, we are in the best position for fulfilling our Duties to our Fellow-men. If the Law of God, properly interpreted, become the rule of life, Justice and Benevolence will produce their legitimate effects. But when Justice and Benevolence are not enlightened, or when either of them is habitually employed without the controlling influence of the other, we must not expect the same results. The Rule of the higher Sentiments will, certainly, be disputed by the Propensities; and selfishness, in one form or another, will counsel ignoble deeds. Self-Love is not itself an evil; it is a necessary part of our Nature. But when Self-Love excludes all other loves, it degenerates into selfishness. When properly directed, Self-Love is a convenient moral test. We are taught to love our Neighbours as Ourselves; to do unto others as we would that they should do

Digitized by Google

unto us,—a heavenly precept which, if fully carried out, would make our Earth a Paradise. Vanity and Pride will often interfere with this golden rule. They are very commercial in their operations; they require a considerable return in the shape of fulsome gratitude and submissive respect, and are not so anxious to do their duty as to secure applause and consideration.

This Class of Duties may be divided into—I. General Duties, which we owe to all Mankind. II. Peculiar Duties, which we owe to certain Individuals.

I. GENERAL DUTIES.

1. *We must not deprive another of Life*, either by an act of Murder or Manslaughter. Self-Defence is a right and a duty. We must not injure the Health of another, or commit any act that diminishes his bodily vigour and comfort.

2. *Property must be held sacred.* We must not take it by violence or by fraud; nor must we wantonly injure its value. This section will be prefaced by an Outline of the Origin and Nature of Property, its principal kinds, and the Institutions connected with them; a few practical suggestions will also be offered on points of which Females should not be ignorant.

3. *Veracity must be scrupulously observed.* Lies may be spoken or acted, direct or indirect. Wilful Suppressions, Equivocations, and Sophisms are lies, and so are Exaggerations. The worst form of lie is Perjury. By an Oath we swear to tell the truth, the whole truth, and nothing but the truth. A Court of Justice requires plain, simple, straight-forward answers, without reserve or equivocation,—direct to the point, and conveying neither more nor less than the questions demand. Witnesses are not in their answers to anticipate what they suppose may be future questions. They must tell what they know, not what they have heard; and they must be careful not to confound what they know with inferences which they have drawn from what they know.

4. *We must respect the Affections* of others; we must not rob them of the Affections of those who are dear to them.

5. *We must not corrupt the Moral Purity* of others, either directly by persuasion, or indirectly by example.

6. *We must not injure the Reputation* of others. Detraction, Scandal, and Backbiting, are odious vices, and as mean and cowardly as they are odious; for they cannot be guarded against, and the mischiefs which they occasion are frequently beyond

Digitized by Google

redress, even after the injured character has been completely vindicated by the most positive evidence. For these reasons, a great author speaks of Detraction as less excusable than theft. An ingenious and very successful form of Scandal is that in which truth and falsehood are artfully blended. That which is said to the injury of another may be true; the vice is then less atrocious, but its source is still low—Envy, Jealousy, defective Justice and Benevolence. Card-playing has been defended as a means of occupying the time which would be otherwise spent in scandalizing gossip. The best plan is to fill the mind with pure and noble ideas—to imbue it with a love of the Great, the Good, the Beautiful, and the True, and then there will be not only no time, but no inclination, for the frivolities of vulgar chit-chat.

7. *We must abstain from injuring the Mental Tranquillity* of others, either directly by some positive act, or indirectly by the suggestion of some painful idea. Minor Morals, the Laws of Politeness and Good Breeding, belong to this section.

8. *Philanthropy*. Justice and Benevolence to all—Strangers and Friends—Foreigners and Fellow-subjects. If Charity begin at home, it must not end there. The benefits we enjoy, particularly Religion and the Useful Arts, should be diffused. To assist in reclaiming a barbarous people is a privilege for which we ought to be grateful; but it must not be offered as an excuse for the neglect of more immediate duties.

II. Peculiar Duties.

1. *The Duties which arise from Affinity*. The Duties of Husbands and Wives. The Union of One Man and One Woman is ordained by God. Married Life has many joys, but it has, likewise, many cares and responsibilities, and, therefore, should not be lightly entered into. Some should never marry at all. There are incompatibilities which, if disregarded, produce misery. The Husband and the Wife owe to each other Love, Fidelity, Respect, Forbearance, and Counsel. The Husband, as the Head, has his rights; but these rights bring with them corresponding duties, as Protection, Support, &c. The Wife owes Obedience, Prudence in the management of the house, and care in the bringing up of the Children.

The Duties of Parents and Children. Parents owe to their Children Maintenance according to their position and circumstances, Education, Settlement, and at all times Counsel and Advice. Children owe their Parents, Obedience, Respect, Care

Digitized by Google

not to give Offence, Confidence, Support when needed, an Endeavour to make a return for the good received—the best return is the gratitude of a loving heart. The Duties of Guardians and Wards will be here considered. Guardians are in the place of Parents, and if they consent to accept the office, they are bound to fulfil its Duties with kindness, integrity, and prudence. Wards owe their Guardians respectful Obedience and Confidence. Too much must not be expected on either side. The love that springs from Affinity cannot be justly demanded. The Duties of Teachers and Pupils belong to the same Section as the last. Teachers occupy, for a time, the place of Parents, and the parental duties, so far as they are applicable, must be observed. A Teacher should acquire just ideas of the dignity and responsibility of his office. He must see that his moral, religious, and intellectual qualifications entitle him to success. He must know what he has to do, and he must know how to do it. His discipline must rest on firmness and kindness, without any approach to indulgence or severity. Pupils should remember, that the authority of a Teacher is derived from their Parents, and hence entitled to respect and confidence. The important office which a Teacher fills, his age, his knowledge, and his persevering endeavours to instruct and improve his Pupils, should inspire them with the attention and obedience that spring from the better feelings. A good Teacher is a real friend, and when this idea is entertained, Pupils cheerfully comply with his directions, even though they do not comprehend their value. Pupils should consider that idleness and neglect are offences against themselves, their parents, their teachers, and, what is more than all, against Him who gave them the opportunities they are throwing away.

2. *Duties which arise from Rank.* Superiors are entitled to respect, but not to abject submission, or the sacrifice of truth and dignity. Sycophancy is not respect; it is a low form of selfishness, seeking its own ends by an appeal to a supposed personal weakness. Obedience is often a positive duty; but this must not extend to the commission of evil. Situations of trust require a large share of active conscientiousness which induces an habitual faithfulness, even in things which appear trifling to an inferior morality. Without Benevolence this will be a difficult task. Envy and Detraction must be guarded against, even though they may assume the engaging form of *a love of virtue*. When love of virtue is chiefly displayed in rigorous comments upon the failings of Superiors in rank, fortune, or talent, its origin is less pure than self-conceit is apt to imagine. Superiors and Inferiors have

Digitized by Google

often the same vices, but so modified by circumstances as to appear almost entirely different. The conduct of Superiors towards Inferiors should be based on an enlightened conviction of responsibility. There is a prudent selfishness that observes the letter of the law and complies with the fashion of the day; but this is not enough. They who are beneath us should be treated, not only with legal but with Christian Justice. Pride, Austerity, and Indifference, cannot dignify. They are the mean Offspring of Selfishness, and are never so contemptible as when they are displayed towards those who have none to help them. The behaviour of Children towards Servants and Dependants should be carefully watched and corrected.

3. *Duties which arise from Friendship.* Of the happiness that results from true Friendship there can be no doubt. Vows of Friendship are often inconsiderately made, before the parties are thoroughly acquainted. Friendship must arise from the recognition of estimable qualities; if these be absent, there can be no genuine Friendship. When Friendship is once formed, there must be perfect confidence and sincerity, together with a readiness to assist, to console, and to vindicate. The highest and the most difficult duty of this kind is that which seeks the moral reformation of a Friend. There are transient associations to which the name of Friendship is improperly given,—Friendships of Interest, Amusement, Vanity, and the Grosser Vices.

4. *Duties which arise from Benefits received.* It is our duty to love those who have done us some important kindness, to study their interests, to promote their happiness, and to do everything in our power to repay the obligation. In a word, we ought to be grateful. Benefactors have, likewise, their Duties. The motive that prompts the act must be sound, and the manner of doing it must neither wound the feelings nor injure the interests of the party obliged. The conduct of the Benefactor, after the benefit has been conferred, must be equally generous. Of all tyrannies, none is so odious as the tyranny of one who has done us good. They who complain of Ingratitude should consider how far they have brought it upon themselves.

5. *Duties to Enemies.* If we have Enemies, why are they Enemies? Is the fault theirs or ours? In either case, Christianity prescribes the line of conduct. On the one side, acknowledgment of wrong doing, and reparation, if possible; on the other, forgiveness. Retaliation is heathenish and savage. There are cases in which it is impossible to reinstate an Enemy in the place which he held in our affections; but there must be no Malevolence.

Digitized by Google

"Love your Enemies," is a Divine command, from which there is no appeal. Many of the Quarrels that disturb domestic life arise from a conflict of interests or from causes the most ridiculous and trifling. Vanity, Pride, and the Love of Gain, are of an irritable nature; they are easily offended, but not easily pacified.

6. *Duties which arise from Contract.* Contracts are Implied, Oral, or Written, of which the last are the most satisfactory. In cases of importance, private persons should not rely upon their own skill in the drawing up of a Written Contract. Should they make the attempt, they should never affect the phraseology of lawyers; they should use plain language, arranged in short simple sentences; they should be very careful in the use of Pronouns and Synonymes. In entering into and carrying out a Contract, we have three great guides—Prudence, Justice, and Benevolence. With these for our Arbiters, let us inquire into the Duties of Landlords and Tenants, Employers and the Employed, Buyers and Sellers, Borrowers and Lenders. Before a Contract is entered into, we should ascertain the character of the party and his ability to perform what he is about to undertake. False delicacy and good-nature frequently lead us astray by suppressing or colouring the truth—a very mischievous social offence. The particulars of the Contract should be fairly laid down and thoroughly understood, without the least Concealment, Exaggeration, Equivocation, or Misrepresentation of any kind. No advantage should be taken of position, ignorance, or necessity; whatever is fair and proper should be offered and accepted, because it is fair and proper. The terms of the Contract being settled and agreed to, its provisions should be faithfully and punctually carried out according to their spirit and intention. Whatever is expected by one side, and known to be so expected by the other, is to be deemed (morally) a part or condition of the Contract. The importance of business transactions, and the danger of ignorance concerning them, have long induced the Lecturer to draw the attention of his pupils to the subjects which may be brought before them, and for which they ought not to be wholly unprepared; as, for example,—Wills, Marriage Settlements, Leases, Bills of Exchange, Promissory Notes, I. O. U., Signing one's name as a matter of form, or to oblige a friend, &c., &c. Many a Lady has been utterly ruined in consequence of her ignorance of these things.

7. *Civil Duties.* Introduction:—A short Account of the Origin and Nature of Civil Government, the different forms of Government, particularly of that under which we have the happiness of living.

Digitized by Google

The members of a state are bound to defend that state, to obey its laws, and to promote the general happiness by every means in their power.

The duty of defence need not be enlarged upon in this place. Ladies are not called upon to defend their country against external or internal foes; but there are duties of patriotic influence and active benevolence which are peculiarly their own.

The Duty of Obedience is equally obvious. Laws may be amended or repealed, and the British Constitution provides ample machinery for doing either the one or the other; but they must be obeyed till they are amended or repealed. Obedience to Law is one of the characteristics of our Nation, and not the least of the causes that have raised it to its present position. There is, however, room for improvement. The evasion of Taxes, the practice of petty smuggling, and the corrupt practices at elections, are instances in point.

The duty of promoting the general happiness includes those political ameliorations which are necessary for the public good. An insatiable Love of Change, and a settled Antipathy to Change, are prejudices, the prevalence of either of which would soon produce anarchy and confusion. Females mistake their vocation when they enter the arena of party politics, and, in the fierce conflict of opposing interests, forget the sacred mission with which they are charged. The next group of this class of duties is more compatible with their character and position, namely, the duties of relieving and improving their fellow-subjects. 1. *Relief.* Some cases demand, or seem to demand, immediate relief, and Charity must not refuse it. But, as a general rule, indiscriminate Charity is bad,—bad to the receiver, to the giver, and to others. There is an indolent Charity—a vain Charity—an arrogant Charity—a commercial Charity. Compare each of these with the self-denying Charity that seeks out proper objects, and relieves them in a proper manner, with no other motives than those which spring from Piety and Love. The best Charity is that which puts the recipient above the necessity of future Charity. Charity should aim at making useful men and women, and not paupers. Public institutions for the relief of the necessitous and the afflicted, and private associations for helping those who would be otherwise overlooked, will be considered in this place. The mere act of giving is easy enough to those who have the means, but what to give and how to give it are often difficult questions, and, therefore, we need not be surprised, that many mistakes have been made by Societies as well as individuals. Instinctive Benevolence, acting without the co-operation of Justice and Reason, is very liable to err; and that it does err,

Digitized by Google

a few examples will be given, by way of warning. The means of raising funds for benevolent purposes are not always unexceptionable. 2. *The Improvement* of those who are within our influence includes their *Material Comforts* and their Mental and Religious *Education*. The Material Comforts of the Working Man are not what they ought to be. The questions of physical and moral progress are intimately connected; but the former stands first in order of time, and it is also the surest means of securing the latter. The soundest doctrines have little effect on a man who is badly housed, badly fed, and badly clothed, without any one of the Comforts and Conveniences which are comprised in the idea of home. Public Baths and Wash-houses, Efficient Water Supply and Drainage, Model Lodging Houses, and well-organized Benefit Societies, are valuable, not only in themselves, but as steps to something better. With respect to education, there is now no doubt that its advantages should be extended to every one. Literally, every one is educated. He is either educated regularly and with wise attention to what he wants, or he is educated irregularly by the circumstances which surround him. As to the objects to be taught, there is much difference of opinion; but as to the fundamental Elements, there can be no reasonable doubt. Every member of a free Christian community should be taught Religion and Morals, Reading, Writing and Arithmetic, the Elements of Geography and History, and the properties of Common Things. To these may be added Gardening (if practicable) for Boys, and Needle Work and useful Household Duties for Girls. Many advocate a more extensive course, but if this were efficiently carried out, we should have no reason to complain of our primary Education. When this primary Education is finished, or brought abruptly to a close, What is to be done? There are many Institutions, more or less promising and advantageous to certain classes and localities, but the greater number fail in their principal Object, while the Masses of both sexes are virtually excluded from them all. What, then, will reach the desired end? The teachings of an Enlightened Press, and the influences of a comfortable home. To secure and diffuse these great means of civilization, should be the constant aim of every genuine philanthropist.

Digitized by Google

EDUCATION.

The subject of Education has been incidentally illustrated in several of these Lectures. Its vast importance, however, demands more regular treatment.

Education is General or Special. The former fits us for the common duties of life. The latter refers to the qualifications which are required for the different Trades, Professions, and Callings. The Special Education of Females should aim at the proper discharge of their domestic duties. Cases of extraordinary genius or necessity are exceptional; but, as a general rule, Home is the proper sphere for the exertions of Woman.

Of Home duties, none is more important than Education. Females are naturally the primary Educators of our race. As Mothers and Nurses, they operate upon the mind at a time and in a manner most favourable for making impressions. What they do, whether good or bad, is seldom effaced. They prepare the soil, they sow the first seed;—and, to a very great extent, the happiness or misery of a life is in their hands.

Are these truths recognized in practice? Are they who will be Mothers trained to meet the requirements of their future position? When help is wanted, are sufficient precautions taken? A Nurse is hired—of course from the lower classes. The lower classes are the principal Infant Educators; and does it never occur to us, that when we refuse or limit the means of popular improvement, the effects of what we do, or neglect to do, are reflected upon our children and ourselves? In due time, a Governess is engaged. Where does she come from, and what are her qualifications? How are we prepared to treat her? These are important Questions, the consideration of which will shew how little Education is understood and valued as it ought to be.

Education has two Objects:—1. Education properly so called; that is, the development and training of the various faculties, so as to render them capable of acting vigorously, and in a manner most conducive to the happiness of the possessor, and of those with whom he is connected. 2. Instruction—the Communication of Knowledge, and its Application to Useful Purposes.

As the Faculties and the various objects of Instruction are naturally divisible into the Physical, the Intellectual, and the Moral, the consideration of the two Objects of Education will be conducted under the three heads of Physical Education, Intellectual Education, and Moral Education.

Digitized by Google

Our Educational Arrangements must embrace the three departments of our Nature. Partial Education, in which attention is directed almost exclusively to one or two of these essentials, invariably leads to evil. Happiness is best ensured by the harmonious cultivation of our whole Nature, the Elements of which, though possessed of different properties, are not entirely independent of one another. If we wish to cultivate the intellect and adorn it with brilliant attainments, we shall fail in our efforts if we neglect the Body and the Morals. If we Educate the Physical and the Intellectual systems and omit the Moral from our Course, our failure is not so obvious to the superficial, but it is still a failure. We develop power without at the same time developing its directing and controlling influences. Of all humiliating spectacles, what is so humiliating as the spectacle of a Great Mind hopelessly prostrate beneath an overwhelming load of Moral defilement and degradation? Many Educational Failures of different kinds may be traced to the ignorant infringement of the Law here enunciated.

Physical Education. Whatever acts upon the bodily Organs so as to develop their strength and bring them into healthful activity, is included under Physical Education. The Great Necessaries of Life are, likewise, the great Physical Educators. As these have been fully discussed in a previous Course, a brief recapitulation, specially applied to the wants of Early Education, will be sufficient for our present purpose. It may be useful, however, to add, that Educators should begin at the beginning, and acquire a sufficient knowledge of the principal Organs and their Functions, as the only safe means of carrying out their duties.

Physical Education is not confined in its effects to the body; it has its intellectual and moral relations. The Body acts upon the intellectual and moral faculties, and the intellectual and moral faculties act upon the Body.

Corporeal Sickness and Debility, Nervous Irritability, Mental Dulness and Stupidity, Peevishness and Selfishness, are among the Consequences of neglected or badly managed Physical Education.

Intellectual Education. The various Faculties must be developed by direct appeals to each faculty, with a nice attention to Age, Health, Ability, previous Knowledge, and other influential circumstances. Rote Lessons increase and strengthen verbal memory, and are so far useful; but they have no farther *Educative* value, while they frequently do much harm by deadening the powers of thought and producing a disgust for mental employments. The tiresomeness of common tasks compels the teacher to

Digitized by Google

call in the assistance of Fear, Vanity, Conceit, and other unworthy stimulants, to force the pupil on against the law of his nature. The Faculties, properly appealed to, delight in exercise.

Similar remarks apply to Instruction. The Mind is not an empty vessel to be filled, nor is it a blank surface to be impressed; it is a collection of faculties made for getting knowledge by their own labour. To be valuable, knowledge must be made our own by a process of Mental Assimilation. Word learning is, doubtless, very important, but we must not put it to do the work of Perception and Reason.

After these preliminary Observations, the principal items of a liberal Education, the effects they produce, and the means of attaining them, will be reviewed in the following order.

1. *The Means of receiving and giving Knowledge:* Speaking and Reading; Writing; Drawing; Composition and Grammar; Rhetoric; Logic; Foreign Languages.

2. *Mathematics:* Geometry; Arithmetic.

3. *The Natural Sciences:* Natural History and Natural Philosophy, preceded, in early years, by Lessons on Objects.

4. *Geography and History:* General, Physical, and Mathematical Geography; General, Literary, and Scientific History.

5. *Human Nature:* Physiology; Mental Philosophy.

6. *Religion and Morals*, considered as Objects of Intellectual Study: Natural Theology; Sacred History; The Evidences of Christianity; Moral Duties. The Book of Common Prayer.

7. *Refined and Refining Accomplishments:* Poetry and Works of Imagination and Taste; Drawing and Painting; Ornamental Needle Work; Vocal and Instrumental Music. Dancing and Deportment, though chiefly physical, may be added to complete the list.

8. *Practical Applications:* The Preservation of Bodily and Mental Health; Domestic Economy; Useful Needle Work; Intellectual Difficulties; Recreation, including Scientific Pursuits, Literature, the Fine Arts, the Pleasures of Taste, Conversation, Games, and Social Meetings for General Amusement and Gratification.

Intellectual Education has its Physical and Moral Relations.

Moral Education requires the most watchful care. It commences at the earliest period of Life. The Propensities soon

Digitized by Google

begin to display their native turbulence and rapacity. They must be restrained by a judicious admixture of intelligence, firmness, and kindness. Indulgence and severity are equally objectionable. The groundwork of Moral Education is generally completed in the first few years, and if the Mother, through carelessness or incompetence, has not done her duty, the professional Educator must endeavour to repair and amend what is faulty, and, in some measure, to counteract the effects of wasted time and perverted opportunities.

The abuse of the Propensities gives rise to Gluttony, Violence, Vindictiveness, Cruelty, Insolence, Cunning, Dishonesty, Falsehood, Vanity, &c., according to the peculiarities of the individual. The natural Restraints of the Propensities are the Sentiments, particularly Piety, Justice, and Benevolence, which look beyond Self-indulgence and inculcate Self-denial, Temperance, Kindness, Conscientiousness, and Love to God. The Education of the Sentiments must be commenced as early as possible. The love of a child for its Mother must be expanded to include other beings, and, at length, under the Mother's guidance, should be reverently exalted to the Great Cause of Life and Happiness—the Fountain of Love and Joy. A Pious Mother soon teaches her child to pray, and, as its intellect unfolds, it understands and takes a pleasure in the services of the Church, as well as in the devotions of the domestic circle.

Children may soon be introduced to the simple Histories and Parables of the Bible, particularly the New Testament; but not as a task or reading Lesson, but in the attractive form of familiar conversational Narrative, with illustrative Pictures and Engravings. There must be no mistake here; everything must be simple, easy, and gradually progressive. When a child can read with tolerable ease, it should have a Bible, but not before. Doctrines must be imparted incidentally and by degrees,—on the inductive plan, so that when the time arrives for examining the Established Creed, and the higher branches of Natural and Revealed Religion, the Pupils may feel that they are not entering into anything new, but that they are merely going on in the course which they began years ago. This is a very important point, not sufficiently attended to in the teaching of this and other subjects.

We must not forget the difference between Religious Knowledge and *Religion*. The former is an intellectual attainment easily secured in a Christian Country; but the latter is an affair of the heart, a Heavenly Influence pervading the Affections and Feelings. The value of Knowledge is not disputed, but, religiously speaking, it is not *the one thing needful*. Neither is Religion a

Digitized by Google

mere sentiment manifesting itself in outward Observances. These may be very proper, and they may be adopted and carried out with perfect sincerity; but they may emanate from a cold, selfish heart. There must be Forms, Rites, and Ceremonies—we cannot do without them—but we must not rest upon them. Religion is not satisfied with so barren a faith. The faith it requires is far more fruitful; it is the faith of a Regenerate heart, overflowing with love to God and Man, a heart that manifests its sincerity in deeds of genuine Piety and Love, a heart that does not presumptuously rely upon its own goodness, but, conscious of its innumerable failings and imperfections, claims no reward, either here or hereafter, for what it has thought and done, but rests all its hopes on Him who did no sin, the one Mediator between God and Man, Jesus Christ the Righteous, the Captain of our Salvation.

In conducting Moral Education, we must employ three instruments—*Precept*, *Example*, and *Practice*, and that these may be founded upon right principles, we must carefully consult the Sacred Scriptures as the grand authority on Moral Subjects. Other Writings, the Works of Great and Good Men, are not to be despised; but their value depends upon their Argeement with the Divine Word. Biography is very attractive and very useful. Commentaries on the Bible and the Prayer Book should be at hand.

Moral Education has its Physical and Intellectual Relations that must not be overlooked.

Practical Education. Our attention will not be confined to Theory. Advanced Pupils who are anxious to acquire practical skill will have many opportunities of seeing the best methods and of testing their own efficiency.

Concluding Advice.

Be sure that you *know the Pupils* you are about to Educate,—their Bodily Constitution and Health, their Minds, their Knowledge, and, if possible, their past History.

Endeavour to *win the regard of your Pupils*, so that they esteem you as a friend. Avoid all unnecessary displays of authority.

Rely upon their honour and good faith, and let them see that you trust them. There is a medium between Credulity and Incredulity; but it is better to believe too much than too little; unmerited suspicion and disbelief are very mischievous. If there

Digitized by Google

be no positively evil consequences, act upon what you are told, and let the Pupils see and feel the effects of what they have said. There cannot be a better means of encouraging Veracity and correcting any tendency to the reverse.

Let your discipline be firm and kind. Beware of spoiling a child by inordinate Indulgence or Excessive Severity. Yield nothing to Violence, Insolence, or Obstinacy. Never employ one evil to cure another. Take care how you use the lower Propensities as Moral Incentives; they are dangerous Allies.

Be very careful about your Religious Instruction; a mistake is not easily rectified. See that you sow not the Seeds of Infidelity or Superstition, Indifference or Disgust. Young persons are apt to think of Religion as something gloomy and austere,—a melancholy form to be gone through once a week. Shew that Religion is founded on Love; that God is Love; and that His Beneficence is not confined to any time or season. Many fundamental truths may be imparted incidentally during the treatment of other subjects; and, thus received, they often make a strong impression.

Be and do what you tell your Children and Pupils to be and do. Precept without Example will not do much good. Never treat serious and important subjects with levity. Children understand long before they can express. Respect yourselves if you would be respected.

Do not expect Children to excel alike in all subjects. The same Faculties may be in all, but not in the same degree of strength.

All should receive a Good General Elementary Education. When that is completed, *consult the genius of the Pupil*, and let it have full scope in the right direction. *Do not work against Nature.*

When, as a Teacher, you are about to commence a subject, consider—1. *The Faculties* that will be chiefly required. 2. *The Knowledge* that is wanted to make a fair beginning. Then turn to your Pupils, and observe their state with regard to these points.

Educate Verbal Memory in a legitimate way, by Recitations from good authors, and in certain necessary parts of Grammar; but do not make it a substitute for Intellectual Teaching.

When you teach things exhibit the things; if this be impossible, use good representations of them.

Do not treat the *Mind* as if it were *a vessel to be filled* with

Digitized by Google

your knowledge, but make your Pupils employ their faculties in gaining it.

Now and then change your Method of teaching—from the Analytical to the Synthetical—from the Synthetical to the Analytical—from Reading to Lecture—from Lecture to private Study—from private Study to Conversation. Change your Books occasionally. The Teacher must be kept awake as well as the Pupil.

Repress the affected dread, which some young ladies put on, *of being thought useful.* Shew that Elegance and Usefulness elevate and improve each other, and that the truly accomplished Woman is she who possesses the refined Adornments of Life, and is, at the same time, both able and willing to perform its more serious and homely duties.

Do not neglect Physical Education. Girls require a great deal of looking after in this respect. Explain to them, as early as possible, the great laws of health, and the consequences of disobedience. In this, as in other departments, you must have their co-operation, or you fail.

Do not forget Recreation. Encourage lively games in the Open Air. The lungs must be exercised as well as the limbs. Boisterous rudeness and finical affectation are equally vulgar, and, therefore, equally offensive to genuine refinement and good sense. Impress upon your Pupils the necessity of relying upon themselves for amusement. Attend to the accomplishments as well as to graver matters. A learned Woman destitute of the Graces that belong to her station, is deprived of at least half her means of Usefulness. Be careful to shew your Pupils, that the elegant arts they have acquired should not be exclusively reserved for self-enjoyment; but, on the contrary, they are never so well employed as when they are devoted to the entertainment of a social party, particularly—lay great stress upon this, for it is often lost sight of—particularly if that party consist of the family Circle. Home must never be referred to as a dull place. LET WIVES AND DAUGHTERS PERFORM THEIR DUTIES, AND THERE WILL BE FEW DULL HOMES.

THE END.

Digitized by Google

APPENDIX.

ADDITIONAL LECTURES ILLUSTRATING SOME OF THE PRECEDING SUBJECTS.

I. The Substances employed in Building.

1. *Mineral Substances*, their General Characters and Geological Position.
2. *Vegetable Substances*, their Botanical Characters and Geographical Localities.
3. *Animal Substances*, their Composition and Preparation.
4. *Paints and Colours*, their Chemical History.

II. Architecture.

1. *Domestic Architecture*, Ancient and Modern.
2. *Ornamental Architecture*, Ancient and Modern.

III. The Substances employed in Dress.

1. *Substances from the Animal World.*
2. *Substances from the Vegetable World.*
3. *Impervious Substances.*
4. *Substances employed in Dying and Bleaching.*

IV. The History of Food.

1. *Food in different Ages and Countries.* Ancient and Modern Meals.
2. *The Philosophy of the Tea Table.* Tea, Coffee, &c.
3. *Useful Arts:*—Cooking Utensils; Cutlery; Plate; Pottery; Porcelain; Glass.

Digitized by Google

V. THE WRITING DESK: Its Materials; Paper; Pens; Ink; Wax; Seals; Wafers; Lucifers, Tapers, &c.

VI. THE WORK BOX: Its Materials; Scissors; Needles; Pins; Thimble; Cotton, Linen, Silk, and Woollen Thread, &c.

VII. THE COLOUR BOX. Pencils; Chalk; Indian Ink; the Principal Colours; Indian Rubber, &c.

VIII. MONEY: What Money is and what gives it value; Coins; Bank Notes; Promissory Notes, and Bills of Exchange.

IX. MODERN EDUCATIONAL REFORMERS: Ascham; Milton; Locke; Butler; Pestalozzi; Edgeworth; Bell; Lancaster; Wilderspin.

X. THE HISTORY OF WOMAN: Her Treatment in different Ages and Countries, and the Consequences of that Treatment. "Woman's Mission" defined; the Duties and the Rights connected with it.

LONDON: HARRISON AND SONS, PRINTERS, ST. MARTIN'S LANE.

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google